MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

BACHELOR OF TECHNOLOGY
ELECTRICAL AND ELECTRONICS ENGINEERING

ACADEMIC REGULATIONS
(Batches admitted from the academic year 2020 - 2021)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- ” Autonomous Institution /College” means an institution/college designated as autonomous institute / college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.

- “Academic Autonomy” means freedom to a college in all aspects of conducting its academic programs, granted by the University for promoting excellence.

- “Commission” means University Grants Commission.

- “AICTE” means All India Council for Technical Education.

- “University” the Jawaharlal Nehru Technological University, Hyderabad.

- “College” means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.

- “Program” means:
    - Bachelor of Technology (B. Tech) degree program
    - UG Degree Program B. Tech

- “Branch” means specialization in a program like B. Tech degree program in Electronics & Communication Engineering, B. Tech degree program in Computer Science and Engineering etc.

- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.

- T–Tutorial, P–Practical, D–Drawing, L-Theory, C-Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

"A thought beyond the horizons of success committed for educational excellence"

PRINCIPAL

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
Sponsored by CMR Educational Society
(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)
Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.
Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

VISION

- To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- To become a model institution in the fields of Engineering, Technology and Management.
- To impart holistic education to the students to render them as industry ready engineers.
- To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- To provide state of art infrastructure and expertise to impart quality education.
- To groom the students to become intellectually creative and professionally competitive.
- To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never-ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
COURSE STRUCTURE

I Year B. Tech (EEE) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0001	English	2	0	0	2	30	70
2	R20A0021	Mathematics – I	3	1	0	4	30	70
3	R20A0011	Applied Physics	3	0	0	3	30	70
4	R20A0401	Analog and Digital Electronics	3	0	0	3	30	70
5	R20A0501	Programming for Problem Solving	3	0	0	3	30	70
6	R20A0082	Applied Physics Lab	0	0	3	1.5	30	70
7	R20A0084	Engineering and IT Workshop	0	0	4	2	30	70
8	R20A0581	Programming for Problem Solving Lab	0	0	3	1.5	30	70
9*	R20A0014	Environmental Science	2	0	0	0	100	-
		TOTAL	**16**	**1**	**10**	**20**	**340**	**560**

I Year B. Tech (EEE) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0002	Professional English	2	0	0	2	30	70
2	R20A0022	Mathematics – II	3	1	0	4	30	70
3	R20A0201	Basic Electrical Engineering	3	0	0	3	30	70
4	R20A0301	Computer Aided Engineering Graphics	2	0	2	3	30	70
5	R20A0502	Python Programming	3	0	0	3	30	70
6	R20A0081	English Language Communication Skills Lab	0	0	4	2	30	70
7	R20A0281	Basic Electrical Engineering Lab	0	0	3	1.5	30	70
8	R20A0582	Python Programming Lab	0	0	3	1.5	30	70
9*	R20A0003	Human Values and Professional Ethics	2	0	0	0	100	-
		TOTAL	**15**	**1**	**12**	**20**	**340**	**560**

***Mandatory course: Non-credit subject, 50% of scoring is required for the award of the degree**

II Year B. Tech (EEE) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0023	Mathematics-III	3	0	0	3	30	70
2	R20A0202	Electrical Machines – I	3	0	0	3	30	70
3	R20A0204	Electro Magnetic Fields	3	0	0	3	30	70
4	R20A0205	Control Systems	3	0	0	3	30	70
5	R20A0206	Electrical Circuit Analysis	3	0	0	3	30	70
6	R20A0410	Linear and Digital IC	3	0	0	3	30	70
7	R20A0466	Analog & Digital Electronics Lab	0	0	3	1.5	30	70
8	R20A0282	Electrical Circuits Lab	0	0	3	1.5	30	70
9*	R20A0008	Global Education and Professional Career	2	0	0	0	100	-
		TOTAL	**20**	**0**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech (EEE) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0024	Probability and Statistics	3	0	0	3	30	70
2	R20A0203	Electrical Machines – II	3	0	0	3	30	70
3	R20A0207	Power System – I	3	0	0	3	30	70
4	R20A0210	Electrical Measurements & Instrumentation	3	0	0	3	30	70
5	R20A0061	Managerial Economics & Financial Analysis	3	0	0	3	30	70
6	**OE I**	**OPEN ELECTIVE - I**	3	0	0	3	30	70
7	R20A0283	Control Systems and Simulation Lab	0	0	3	1.5	30	70
8	R20A0284	Electrical Machines - I Lab	0	0	3	1.5	30	70
9*	R20A0004	Foreign Language: French	2	0	0	0	100	-
		TOTAL	**20**	**0**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE I		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R20A1251	WEB DESIGNING TOOLS
2	R20A0551	INTRODUCTION TO DBMS
3	R20A0351	INTELLECTUAL PROPERTY RIGHTS
4	R20A0051	ENTERPRISE RESOURCE PLANNING
5	R20A0451	BASICS OF COMPUTER ORGANIZATION

III Year B. Tech (EEE) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0208	Power System- II	3	0	0	3	30	70
2	R20A0211	Power Electronics	3	0	0	3	30	70
3	R20A0212	Switch gear and Protection	3	0	0	3	30	70
4	R20A0213 R20A0214 R20A0215 R20A0510	**PROFESSIONAL ELECTIVE - I** Industrial and Allied Electrical Systems Electrical Machine Design Power Plant Engineering Computer Networks	3	0	0	3	30	70
5	R20A0216 R20A0217 R20A0218 R20A0403	**PROFESSIONAL ELECTIVE - II** 1. High Voltage Engineering 2. Electrical Estimation and Costing 3. Energy Storage Systems 4. Signals and systems	3	0	0	3	30	70
6	**OE II**	**OPEN ELECTIVE - II**	3	0	0	3	30	70
7	R20A0285	Electrical Machines - II Lab	0	0	3	1.5	30	70
8	R20A0286	Electrical Measurements Lab	0	0	3	1.5	30	70
9	R20A0291	Application Development - I	0	0	4	2	30	70
10*	R20A0007*	Indian Constitution	2	0	0	0	100	-
		TOTAL	**20**	**0**	**10**	**23**	**370**	**630**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE - II		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R20A1252	MANAGEMENT INFORMATION SYSTEMS
2	R20A0552	JAVA PROGRAMMING
3	R20A1253	SOFTWARE PROJECT MANAGEMENT
4	R20A0452	INTERNET OF THINGS & ITS APPLICATIONS
5	R20A0553	OPERATING SYSTEM CONCEPTS
6	R20A0066	PUBLIC POLICY & GOVERNANCE

III Year B. Tech (EEE) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0209	Power Systems- III	3	0	0	3	30	70
2	R20A0566	Artificial Intelligence & Machine Learning	3	0	0	3	30	70
3	R20A0219 R20A0220 R20A0221 R20A0222	**PROFESSIONAL ELECTIVE - III** 1. Power System Operation and Control 2. Power System Dynamics & Stability 3. Power System Reliability 4. Electrical Distribution Systems	3	0	0	3	30	70
4	R20A0223 R20A0224 R20A0225 R20A0226	**PROFESSIONAL ELECTIVE - IV** 1. Solid State Drives 2. Optimization Techniques 3. Digital Control Systems 4. Automation with PLC Systems	3	0	0	3	30	70
5	**OEIII**	**OPEN ELECTIVE - III**	3	0	0	3	30	70
6	R20A0287	Power Electronics & Simulation Lab	0	0	3	1.5	30	70
7	R20A0580	AI & ML Lab	0	0	3	1.5	30	70
8	R20A0292	Application Development - II	0	0	4	2	30	70
9*	R20A0006*	Technical Writing	2	0	0	0	100	-
		TOTAL	**17**	**0**	**10**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE - III		
S.NO	**SUBJECT CODE**	**SUBJECT**
1	R20A0453	ROBOTICS & AUTOMATION
2	R20 A1254	BIG DATA ARCHITECTURE
3	R20A6251	INFORMATION SECURITY
4	R20A0554	CLOUD COMPUTING FUNDAMENTALS
5	R20A0352	DESIGN THINKING
6	R20A0029	BUSINESS ANALYTICS

IV Year B. Tech (EEE) – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0414	Microprocessors & Microcontrollers	3	0	0	3	30	70
2	R20A0227	Electric Vehicles	3	0	0	3	30	70
3	R20A0519	Big Data Analytics	3	0	0	3	30	70
4	R20A0228 R20A0425 R20A0229 R20A0230	**PROFESSIONAL ELECTIVE - V** 1. EHVAC Transmission 2. Embedded System Design 3. AI Techniques in Electrical Engineering 4. Smart Grid Technologies	3	0	0	3	30	70
5	R20A0231 R20A0232 R20A0233 R20A0234	**PROFESSIONAL ELECTIVE - VI** 1. Solar & Wind Electrical Systems 2. HVDC Transmission 3. Power Quality & FACTS Devices. 4. Advanced Control of Electric Drives	3	0	0	3	30	70
6	R20A0288	Power Systems Lab	0	0	3	1.5	30	70
7	R20A0487	Microprocessors & Microcontrollers Lab	0	0	3	1.5	30	70
8	R20A0293	Mini Project	0	0	6	3	30	70
		TOTAL	**15**	**0**	**12**	**21**	**240**	**560**

IV Year B. Tech (EEE) – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R20A0337	Innovation, Startups and Entrepreneurship	3	1	0	4	30	70
2	R20A0294	Major Project	0	0	20	10	30	70
		TOTAL	**3**	**1**	**20**	**14**	**60**	**140**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE–I SEM **L/T/P/C**
2/-/-/2

(R20A0001) ENGLISH

INTRODUCTION

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected excerpts support as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

COURSE OBJECTIVES

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing and to ensure error-freewriting.
4. To analyze, interpret and evaluate a text and critically appreciate it.
5. To improve the writing and speaking skills, the productive skills.

SYLLABUS

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To augment the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
   Skimming the text
   - Understanding the gist of an argument
   - Identifying the topic sentence
   - Inferring lexical and contextual meaning
   - Understanding discourse features
   - Recognizing coherence/sequencing of sentences
   - Scanning the text

NOTE:

The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives

1. To develop an awareness in the students about basic formal writing skills.
2. To equip students with the components of different forms of writing, beginning with the required ones:
   - Writing sentences

- Use of appropriate vocabulary
- Coherence and cohesiveness
- Formal and informal letter writing

Unit –I

"The Road not taken" by Robert Frost

Grammar –Tenses and Punctuation (Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes Writing –
Paragraph Writing (Focusing on Tenses and Punctuations)
Reading –The art of skimming and scanning -Reading Exercise Type 1
(Match the statements to the text they refer to)

Unit – II

Act II from 'Pygmalion' by G.B. Shaw

Grammar –Direct and Indirect Speech
Vocabulary– Synonyms, Antonyms
Writing –Essay Writing (Introduction, body and conclusion)
Reading –Comprehending the context– Reading Exercise Type 2
(Place the missing statement)

Unit – III

Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft

Grammar – Voices
Vocabulary –One-Word Substitutes, Standard Abbreviations
Writing –E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading –Reading Comprehension- Reading Exercise Type 3
(Reading between the lines)

Unit – IV

J K Rowling's Convocation Speech at Harvard

Grammar – Articles, Misplaced Modifiers
Vocabulary –Phrasal Verbs
Writing – Précis Writing
Reading –Reading Exercise Type 4
(Cloze test)

Unit –V

Abdul Kalam's Biography

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement
Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading –Reading Exercise Type5
(Identifying errors)

* Exercises apart from the textbook shall also be used for classroom tasks.

REFERENCE BOOKS

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book.2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press.2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES

Students will be able to:

1. Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of the same
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with a set of the new by professional verbal communicative ability

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**
3/1/-/4

(R20A0021) MATHEMATICS - I

COURSE OBJECTIVES:

1. The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of line are quations.
2. The concept of Eigen values, Eigen vectors and Diagonalization.
3. The maxima and minima of functions of several variables.
4. The Applications of first order ordinary differential equations and methods to solve higher order differential equations.
5. The properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem.

UNITI:

Matrices: Introduction, Rank of a matrix - Echelon form, Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss-Seidel method, Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalization of a matrix.

UNIT II:

Multi Variable Calculus (Differentiation): Functions of two variables, Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

UNIT III:

First Order Ordinary Differential Equations: Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay, Equations not of first degree-Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT IV:

DIFFERENTIAL EQUATIONS OF HIGHER ORDER: Linear differential equations of second and higher order with constant coefficients: non-homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V - Method of variation of parameters, Equations reducible to linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

UNIT V:

LAPLACE TRANSFORMS: Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied

and divided by “t”, Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transform of functions when they are multiplied and divided by” s”, Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transform.

TEXT BOOKS

1. Higher Engineering Mathematics by B V Ramana., Tata Mc Graw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics by Kreyszig, John Wiley &Sons.

REFERENCE BOOKS

1. Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2. Ordinary and Partial Differential Equations by M.D. Raisinghania, S. Chand Publishers
3. Engineering Mathematics by N.P Bali and Manish Goyal.

COURSE OUTCOMES:

After learning the concepts of this paper, the student will be able to

1. Analyze the solutions of the system of linear equations and find the Eigen values and Eigen vectors of a matrix, which are used to analyze the long-term behavior of any system.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first order, first degree differential equations and their applications.
4. Form a differential equation for typical engineering problems and hence can solve those higher order differential equations.
5. Solve differential equations with initial conditions using Laplace Transformation.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0011) APPLIED PHYSICS

COURSE OBJECTIVES:

1. To analyze the ordinary light with a laser light and realize the transfer of light through optical fibers.
2. To identify dual nature of the matter and behavior of a particle quantum mechanically.
3. To explore band structure of the solids and classification of materials.
4. To acquire the basic knowledge of various types of semiconductor devices and find the applications in science and technology.
5. To Compare dielectric and magnetic properties of the materials and enable them to design and apply in different fields.

UNIT – I

LASERS & FIBER OPTICS: LASERS: Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.

FIBER OPTICS: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers, Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

UNIT – II

QUANTUM MECHANICS: Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – III

ELECTRONIC MATERIALS: Free electron theory (Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative), E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials: Metals, semiconductors and insulators.

UNIT-IV

SEMICONDUCTOR PHYSICS: Intrinsic and extrinsic semiconductors, Direct and indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: mechanism of diffusion and drift, Formation of PN junction, V-I characteristics of PN diode,

energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT – V:

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS: DIELECTRICS: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossottirelation.

MAGNETISM: Introduction, origin of magnetism, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

TEXT BOOKS:

1. Engineering Physics by Kshirsagar & Avadhanulu, S Chand publications.
2. Engineering Physics- B. K. Pandey, S. Chaturvedi, Cengage Learning.

REFERENCES:

1. Engineering Physics – R.K. Gaur and S.L. Gupta, Dhan Patrai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2nd edition –H.K. Malik and A. K. Singh.
4. Engineering Physics – P.K. Palaniswamy, SciTech publications.
5. Physics by Resnick and Haliday.

COURSE OUTCOMES:

After completion of studying Applied Physics, the student is able to

1. Observe the properties of light and its engineering applications of laser in fiber optic communication systems.
2. Apply the basic principles of quantum mechanics and the importance of behavior of a particle.
3. Find the importance of band structure of solids and their applications in various electronic devices.
4. Evaluate concentration & estimation of charge carriers in semiconductors and working principles of PN diode.
5. Examine dielectric, magnetic properties of the materials and apply them in material technology.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0401) ANALOG AND DIGITAL ELECTRONICS

COURSE OBJECTIVES:

The main objectives of the course are:

1. To familiarize with the principal of operation, analysis and design of pn junction diode.
2. To study the construction of BJT and its characteristics in different configurations.
3. To study the construction and characteristics of JFET andMOSFET.
4. To study basic number systems codes and logical gates.
5. To introduce the methods for simplifying Boolean expressions and design of combinational circuits.

UNIT-I

P-N JUNCTION DIODE: Qualitative Theory of P-N Junction, P-N Junction as a diode, diode equation, volt-ampere characteristics temperature dependence of V-I characteristic, ideal versus practical, diode equivalent circuits, Zener diode characteristics.

UNIT-II

BIPOLAR JUNCTION TRANSISTOR: The Junction transistor, Transistor construction, Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

UNIT-III

FIELD EFFECT TRANSISTOR: JFET-Construction, principle of Operation, Volt–Ampere characteristics, Pinch- off voltage. Small signal model of JFET.FET as Voltage Variable Resistor, Comparison of BJT and FET. MOSFET- Construction, Principle of Operation and symbol, MOSFET characteristics in Enhancement and Depletion modes.

UNIT IV:

NUMBER SYSTEM AND BOOLEAN ALGEBRA: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code, Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-V

MINIMIZATION TECHNIQUES: The Karnaugh Map Method, Three, Four and Five Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

COMBINATIONAL CIRCUITS: Design procedure – Half adder, Full Adder, Half subtractor, Full subtractor, Multiplexer/Demultiplexer, decoder, encoder, Code converters, Magnitude Comparator.

TEXT BOOKS

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications,2017. 2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Haikais, McGraw Hill. 3. Electronic Devices and Circuits, S. Saliva Hanan, N. Suresh Kumar, McGraw Hill.
4. M. Morris Mano, DigitalDesign,3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 /Pearson Education (Singapore) Pvt. Ltd., New Delhi,2003.
5. Switching and Finite Automata Theory- Zvi Kohavi &Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS

1. Electronic Devices and Circuits, K. Lal Kishore B. S Publications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi,2006.
3. John F. Wakerly, Digital Design, Fourth Edition, Pearson/PHI,2006
4. John. M Yarbrough, Digital Logic Applications and Design, ThomsonLearning,2002.
5. Charles H. Roth. Fundamentals of Logic Design, ThomsonLearning,2003.

COURSE OUTCOMES

After completion of the course, the student will be able to:

1. Understand the principal of operation, analysis and design of PN junction diode.
2. Understand the construction of BJT and its characteristics in different configurations.
3. Understand the construction and characteristics of JFET andMOSFET.
4. Understand basic number systems codes and logical gates.
5. Understand the methods for simplifying Boolean expressions and design of combinational circuits.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**

3/-/-/3

(R20A0501) PROGRAMMING FOR PROBLEMS SOLVING

COURSE OBJECTIVES:

1. To understand the use of computer system in problem solving
2. To understand the various steps in Program development.
3. To learn the basic concepts in C Programming Language.
4. To learn how to write modular and readable C Programs
5. To be able to write programs (using structured programming approach) in C to solve problems.

UNIT - I

INTRODUCTION TO COMPUTING: Computer Systems, Computing Environments, Computer Languages, Algorithms and Flowcharts, Steps for Creating and Running programs.

INTRODUCTION TO C: History of C, Features of C, Structure of C Program, Character Set, C Tokens - keywords, Identifiers, Constants, Data types, Variables. Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, typedef, Enum

CONTROL STRUCTURES: Selection Statements (Decision Making) – if and switch statements, Repetition Statements (Loops) - while, for, do-while statements, Unconditional Statements – break, continue, goto, Command line arguments.

UNIT-II

POINTERS – Pointer variable, pointer declaration, Initialization of pointer, accessing variables through pointers, Pointer Arithmetic, pointers to pointers, void pointers

ARRAYS – Definition, declaration of array, Initialization, storing values in array, two dimensional arrays, and multi-dimensional arrays. Arrays and Pointers, Array of pointers

STRINGS – Declaration and Initialization, String Input / Output functions, Arrays of strings, String manipulation functions, Unformatted I/O functions, strings and pointers

UNIT – III

DESIGNING STRUCTURED PROGRAMS USING FUNCTIONS - Types of Functions- user defined functions, Standard Functions, Categories of functions, Parameter Passing techniques, Scope – Local Vs Global, Storage classes, Recursive functions. Passing arrays as parameters to functions, Pointers to functions, Dynamic Memory allocation**.**

UNIT-IV

STRUCTURES AND UNIONS - Declaration, initialization, accessing structures, operations on structures, structures containing arrays, structures containing pointers, nested structures, self-referential structures, arrays of structures, structures and functions, structures and pointers, unions.

FILES – Concept of a file, Streams, Text files and Binary files, Opening and Closing files,File input / output functions. Sequential Access and Random-Access Functions

UNIT-V

BASIC DATA STRUCTURES – Linear and Non- L i n e a r Structures – Implementation ofStacks, Queues, Linked Lists and their applications.

CASE STUDIES

CASE 1: STUDENT RECORD MANAGEMENT SYSTEM

The main features of this project include basic file handling operations; you will learn how to add, list, modify and delete data to/from file. The source code is relatively short, so thoroughly go through the mini project, and try to analyze how things such as functions, pointers, files, and arrays are implemented.

Currently, listed below are the only features that make up this project, but you can add new features as you like to make this project a better one!

- Add record
- List record
- Modify record
- Delete record

CASE 2: LIBRARY MANAGEMENT SYSTEM

This project has 2 modules.

1. Section for a librarian
2. Section for a student

A librarian can add, search, edit and delete books. This section is password protected. That means you need administrative credentials to log in as a librarian.

A student can search for the book and check the status of the book if it is available. Here is list of features that you can add to the project.

1. You can create a structure for a student that uniquely identifies each student. When a student borrows a book from the library, you link his ID to Book ID so that librarian can find how a particular book is borrowed.

2. You can create a feature to bulk import the books from CSV file.

3. You can add REGEX to search so that a book can be searched using ID, title, author or any of the field.

4. You can add the student login section.

TEXT BOOKS:

1. Mastering C, K. R. Venugopal, S R Prasad, Tata McGraw-Hill Education.
2. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, Career Monk publications, 2017

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI.
2. Computer Programming, E. Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabhan, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Data Structures using C by Aaron M. Tenenbaum, Pearson Publications
6. Data Structures using C by Puntambekar

COURSE OUTCOMES:

1. Understand a problem and build an algorithm/flowchart to solve it
2. Interpret the structure of C program and various key features of C
3. Construct C programs using various control statements, arrays and pointers
4. Understand the concept of subprograms and recursion
5. Develop programs using structures and unions for storing dissimilar data items
6. Make use of files and file operations to store and retrieve data

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**

-/-/3/1.5

(R20A0082) APPLIED PHYSICS LAB

COURSE OBJECTIVES:

Students can be able to

1. Identify the specific types of elastic and electrical nature of materials in physics lab.
2. Observe concepts of magnetism in physics lab.
3. Analyze propagation of light in various optical devices practically.
4. Examine various opto electronic devices practically
5. Well-equipped with the properties of semiconductor devices in physics lab.

LIST OF EXPERIMENTS:

1. Torsional pendulum-Rigidity modulus of given wire.
2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. LED -Characteristics of LED.
8. Solar cell -Characteristics of a Solar cell.
9. Optical fiber- Evaluation of numerical aperture of optical fiber.
10. Hall effect –To study Hall effect in semiconducting samples.

REFERENCE BOOKS:

1. Practical physics by Dr. Aparna, Dr K.V Rao, V. G. S. Publications.
2. Engineering physics practical lab manual –MRCET.

COURSE OUTCOMES:

1 Students are able to measure the elastic constants of the given material of the wire and also determine the ac frequency of vibrating bar.

2 Students are able to determine the magnetic induction of a circular coil carrying current by applying the principles of terrestrial magnetism.

3 Students are able to framer relativistic ideas of light phenomenon

4 Students are able to achieve the analysis of V-I characteristics of opto electronic devices

5 Students are able to determine the carrier concentration and identify the given semiconductor material with the help of Hall Effect.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**
-/-/4/2

(R20A0084) ENGINEERING AND IT WORKSHOP

It is consisting of 3 parts: Part I: IT Workshop;
Part-II: Electrical & Electronics Workshop;
Part III: Auto CAD Workshop

Part I: IT Workshop:

COURSE OBJECTIVES:

1. Understand the internal structure and layout of the computer system.
2. Learn to diagnose minor problems with the computer functioning.
3. Know the proper usage and threats of the World Wide Web.
4. Study in detail about the various features of MS-Word, Excel and PowerPoint.
5. Gain awareness about the tools of LibreOffice.

Task- 1: PC HARDWARE

Identification of the peripherals of a computer, components in a CPU and its functions. Block diagram of the CPU along with the configuration of each peripheral. Functions of Motherboard. Assembling and Disassembling of PC. Installing of OS.

Task- 2: TROUBLESHOOTING

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Task 3: INTERNET

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

MS OFFICE

Task 4: MICROSOFT WORD

Introduction to Word Processor, Editing and Formatting features, overview of toolbars, saving files, using help and resources, rulers, fonts, styles, format painter, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word

to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL

Excel Orientation: The importance of Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Excel formulae &Functions: formulae, logical functions, text functions, statistical functions, mathematical functions, lookup functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler (Features: - Gridlines, Format Cells, Summation, auto fill, Formatting) Calculating GPA (Features: - Cell Referencing, Formulae and functions in excel)

Task 6: MICROSOFT POWER POINT

Basic power point utilities and tools, PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Drawing Toolbar-Lines and Arrows, Text boxes, Clipart, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: LIBRE OFFICE

Overview of LibreOffice and its features of Writer, Calc, Impress, Draw, Base, Math, Charts.

Libre office Math: Introduction, Creating & Editing Formulas, formulas as separated documents or files, formulas in office document, Creating formulas, Formula layout

Libre Office Draw: Introduction, Basic shapes, working with objects, flowcharts, organization charts.

TEXT BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. PC Hardware and A+ Handbook-Kate J. Chase PHI(Microsoft)
3. Excel Functions and Formulas, Bernd held, Theodor Richardson, Third Edition
4. Libre Office Documentation: https://documentation.libreoffice.org/en/english- documentation

COURSEOUTCOMES:

1. Ability to identify the major components of a computer and its peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2. Students can detect and perform minor hardware and software level troubleshooting.
3. Capacity to work on Internet & World Wide Web and make effective usage of the internet for academics.

PART II: ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP

COURSE OBJECTIVES:

1. To get acquaintance with Residential house wiring procedure.
2. To obtain the knowledge about fluorescent lamp wiring procedure.
3. To get familiarized with staircase wiring.
4. To perform soldering and de-soldering practice.

LIST OF EXPERIMENTS:

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring
3. Stair case wiring
4. Soldering and De-soldering practice – components, devices and circuits using general purpose PCB.

COURSE OUTCOMES:

1. Students will able to understand domestic wiring procedures practically.
2. Students will able to do fluorescent lamp wiring.
3. Students will able to do staircase wiring.
4. Student will able to soldering and disordering practice.

PART III: AUTOCAD WORKSHOP

1. Introduction to AutoCAD Design Process, AutoCAD Installation Process, AutoCAD user Interface, Function Keys
2. Commands: Drawing Commands, Editing Commands, Drawings aids
3. D Wireframe Modeling
4. CAD Practice Exercises CAD -2D, CAD - Isometric

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE –I SEM **L/T/P/C**

-/-/3/1.5

(R20A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

COURSE OBJECTIVES:

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs.
4. To learn to write programs (using structured programming approach) in C to solve problems.
5. To introduce the students to basic data structures such as lists, stacks and queues.

Week 1:

a. Write a program to find sum and average of three numbers
b. Write a program to calculate simple interest (SI) for a given principal (P), time (T), and rate of interest (R) (SI = P*T*R/100)

Week 2:

a. Write a program to swap two variables' values with and without using third variable
b. Write a program to find the roots of a quadratic equation.

Week 3:

a. Write a program to find the sum of individual digits of a given positive integer.
b. Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result.

(Consider the operators +, -, *, /, % and use Switch Statement)

Week 4:

a. Write a program to find both the largest and smallest number in a list of integers.
b. Write a program to find the sum of integer array elements using pointers

Week 5:

a. Write a program to perform addition of two matrices.
b. Write a program to perform multiplication of two matrices.

Week 6:

a. Write a program to find the length of the string using Pointer.
b. Write a program to count the number of lines, words and characters in a given text.

Week 7:

a. Write a program to find factorial of a given integer using non-recursive function and recursive function.
b. Write program to find GCD of two integers using non-recursive function and recursive function.

Week 8:

a. Write a program using user defined functions to determine whether the given string is palindrome or not.
b. Write a Program to swap the values of two variables using
c. I) Call by Value ii) Call by Reference

Week 9:

a. Write a program to find the sum of integer array elements using pointers, use dynamic memory allocation to allocate memory.
b. Write a program to perform subtraction of two matrices, Design functions to perform read, display and subtract

Week 10:

a. Write a program to create a structure named book and display the contents of a book.
b. Write a Program to Calculate Total and Percentage marks of a student using structure.

Week 11:

a. Write a program that uses functions to perform the following operations:

i) Reading a complex number ii) Writing a complex number
iii) Addition of two complex numbers iv) Multiplication of two complex numbers

b. Write a program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 12:

a. Write a program to copy the contents of one file to another.
b. Write a program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third.

Week 13:

a. Write a program for static implementation of stack
b. Write a program for static implementation of Queue

Week 14:

a. Write a program to perform various operations on single list

Week 15:

a. Write a program for dynamic implementation of stack
b. Write a program for Dynamic implementation of Queue

Case Studies

Case 1: Student Record Management System

The main features of this project include basic file handling operations; you will learn how to add, list, modify and delete data to/from file. The source code is relatively short, so thoroughly go through the mini project, and try to analyze how things such as functions, pointers, files, and arrays are implemented.

Currently, listed below are the only features that make up this project, but you can add new features as you like to make this project a better one!

- Add record
- List record
- Modify record
- Delete record

Case 2: Library Management System

This project has 2 modules.

1. Section for a librarian
2. Section for a student

A librarian can add, search, edit and delete books. This section is password protected. That means you need administrative credentials to log in as a librarian.

A student can search for the book and check the status of the book if it is available. Here is list of features that you can add to the project.

1. You can create a structure for a student that uniquely identify each student. When a student borrows a book from the library, you link his ID to Book ID so that librarian can find how a particular book is borrowed.
2. You can create a feature to bulk import the books from CSV file.
3. You can add REGEX to search so that a book can be searched using ID, title, author or any of the field.
4. You can add the student login section.

TEXT BOOKS

1. C Programming and Data Structures, P. Padmanabhan, Third Edition, BS Publications
2. Computer programming in C. V. Rajaraman, PHI Publishers.
3. C Programming, E. Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S. N Venkateswarlu and E. V. Prasad, S. Chand Publishers
5. Mastering C, K. R. Venugopal and S. R. Prasad, TMH Publishers.

COURSE OUTCOMES:

1. Ability to apply solving and logical skills to programming in C language.
2. Able to apply various conditional expressions and looping statements to solve problems associated with conditions.
3. Acquire knowledge about role of Functions involving the idea of modularity.
4. Understand and apply the Concept of Array, Strings and pointers dealing with memory management.
5. Acquire knowledge about basic data structures and their implementation.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– I SEM **L/T/P/C**
2/-/-/-

(R20A0014) ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES:

On successful completion of this course, students will be able to:

1. Distinguish the inter relationship between living organism and environment.
2. Categorize various types of natural resources available on the earth surface.
3. Detect the causes, and control measures of various types of environmental pollution.
4. Articulate the issues related to solid waste and its management.
5. Explain and understand the importance of sustainable development.

UNIT-I:

ECOSYSTEMS: Definition, Scope, and Importance of ecosystem. Classification, natural and artificial ecosystems, structure - abiotic and biotic component, functions of an ecosystem, food chains, food webs and ecological pyramids.

ACTIVITIES: Case studies, poster making.

UNIT-II:

NATURAL RESOURCES: Classification of Resources: Definition of natural resource, renewable and non -renewable resources. Renewable resources: Energy resources: growing energy needs, solar energy, hydro energy, biogas, biofuel. Non-Renewable Resources: Fossil fuels, refining of Coal, Petroleum, and natural gas. Use of alternate energy source.

ACTIVITIES: Case studies, seminars.

UNIT-III:

ENVIRONMENTAL POLLUTION AND TECHNIQUES: Definition, Types of pollution: Air pollution causes, effects, control measures of air pollution and prevention techniques. Water pollution causes, effects, control measures and techniques.

ACTIVITIES: Debate, seminars

UNIT-IV:

SOLID WASTE MANAGEMENT: Definition of Solid waste, characteristics of solid waste, solid waste management: collection, transportation, processing treatment, disposal methods and e-waste management, 3R techniques: reduce, reuse, and recycle.

ACTIVITIES: Seminars, Case studies.

UNIT-V:

SUSTAINABLE DEVELOPMENT: Definition of sustainable development, concept, sustainable development goals, threats to sustainability, strategies to achieve sustainable development. Introduction to green chemistry, green building concept.

ACTIVITIES: Worksheets, seminars.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4. Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition,2015

REFERENCE BOOKS

1. Environmental Studies by Anubha Kaushik, 4 Edition, New ageinternational publishers
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
4. Environmental Science by Daniel B. Botkin& Edward A. Keller, Wiley INDIA edition

COURSE OUTCOMES:

The basic concepts included in this course will help the student to:

1. Differentiate between various biotic and abiotic components of eco system.
2. Describe the various types of natural resources.
3. Examine the problems associated with waste management.
4. Evaluate the causes, and apply control measures of various types of environmental pollutions.
5. Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**
2/-/-/2

(R20A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

COURSE OBJECTIVES:

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future work place needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

SYLLABUS:

UNIT-I

Listening - Listening for General Details.

Speaking - Description of Pictures, Places, Objects and Persons

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - The summary of Asimov's *Nightfall*

Grammar - If clauses

Vocabulary - Technical Vocabulary

Writing - Paragraph Writing

UNIT –II

Listening **-**Listening for Specific Details

Speaking - Oral presentations

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - A literary analysis of Asimov's *Nightfall*

Grammar - Transformation of Sentences

Vocabulary - Idioms

Writing -Abstract Writing

UNIT –III

Listening - Listening for Gist

Speaking - Mock Interviews

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - Character sketches of Asimov's *Nightfall's* - protagonists and antagonists - Dr. Susan Calvin, Mike Donovan, Stephen Byerley, Francis Quinn

Grammar - Transitive and Intransitive Verbs

Vocabulary - Standard Abbreviations (Mini Project)

Writing - Job Application – Cover letter

UNIT – IV

Listening - Listening for Vocabulary

Speaking - Telephonic Expressions

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract - Theme of Asimov's *Nightfall*

Grammar - Auxiliary verbs, Degrees of Comparison

Vocabulary - Word Analogy

Writing - Job Application -Resume

UNIT – V

Listening - Critical Listening (for attitude and Opinion)

Speaking - Group discussion

NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract -Asimov's *Nightfall*: A Science Fiction

Grammar - Common Errors, Prepositions

Vocabulary - Homonyms, homophones and homographs

Writing - Report Writing

* Isaac Asimov's *Nightfall* for intensive and extensive reading
* Exercises apart from the text book shall also be referred for classroom tasks.

REFERENCE BOOKS:

1. Nightfall, Isaac Asimov;Robert Silverberg,1990
2. Practical English Usage. Michael Swan. OUP.1995.
3. Remedial English Grammar. F.T. Wood.Macmillan.2007
4. On Writing Well. William Zinsser. Harper Resource Book.2001
5. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
6. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press.2011.

7. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES:

Students will be able to:

1. Analyze and interpret a diverse range of engineering concepts through the synthesis of information
2. Understand the impact of professional engineering solutions is societal contexts and demonstrate its knowledge
3. Achieve communicative ability in their personal and professional relations with clarity of speech and creativity in content
4. Function effectively as an individual and a team; and would be able to prepare themselves to be market ready
5. Comprehend and write effective reports and design documentation, manage projects and make effective presentations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**
3/1/-/4

(R20A0022) MATHEMATICS - II

COURSE OBJECTIVES:

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data, also used to find the roots of an equation and to solve differential equations.
2. The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
3. PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learnt to solve typical second order PDE.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I: SOLUTIONS OF ALGEBRAIC, TRANSCENDENTAL EQUATIONS AND INTERPOLATION
SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction, Bisection Method, Method of false position, Newton-Raphson method and their graphical interpretations.
INTERPOLATION: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, Central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II: NUMERICAL METHODS
NUMERICAL INTEGRATION: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.
NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.
CURVE FITTING: Fitting a straight-line, second-degree curve, exponential curve, power curve by method of least squares.

UNIT III:
PARTIAL DIFFERENTIAL EQUATIONS: Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional equation (Heat equation).

UNIT IV:

DOUBLE AND TRIPLE INTEGRALS: Double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar).

UNIT V:

VECTOR CALCULUS: Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - work done, Surface integrals, Volume integral. Green's theorem, Stake's theorem and Gauss's Divergence theorems (Statement & their Verification).

TEXT BOOKS:

1. Higher Engineering Mathematics by B V Ramana., Tata Mc Graw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R. K Iyenger, R.K. Jain, Narosa Publishers.

REFERENCE BOOKS:

1. Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
2. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

COURSE OUTCOMES:

After learning the concepts of this paper, the student will be able to independently

1. Find the roots of algebraic, non-algebraic equations and predict the value at an intermediate point from a given discrete data.
2. Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
3. Solve first order linear and non-linear partial differential equations which are very important in engineering field.
4. Evaluate multiple integrals; hence this concept can be used to evaluate Volumes and Areas of an object.
5. Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**

3/-/-/3

(R20A0201) BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

1. To understand the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
2. To emphasize on the basic elements in electrical circuits and analyze Circuits using Network Theorems.
3. To analyze Single-Phase ACCircuits.
4. To illustrate Single-Phase Transformers and DC Machines.
5. To get overview of basic electrical installations and calculations for energy consumption.

UNIT –I:

INTRODUCTION TO ELECTRICAL CIRCUITS: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

NETWORK ANALYSIS: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,

Network Theorems**:** Thevenin's theorem, Norton's theorem, and Superposition theorem, Illustrative Problems.

UNIT-III:

SINGLE PHASE A.C. CIRCUITS: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Concept of Power Factor, Real, Reactive and Complex power and Illustrative Problems.

UNIT –IV:

ELECTRICAL MACHINES (elementary treatment only): Single phase transformers: principle of operation, constructional features and emf equation.

DC.GENERATOR: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

ELECTRICAL INSTALLATIONS: Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker, Earth Leakage Circuit breaker, Types of Wires and Cables, Earthing. Elementary calculations for energy consumption.

TEXT BOOKS:

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, McGraw Hill Companies.
2. Electric Circuits - A. Chakrabarty, Dhan pat Rai &Sons.
3. Electrical Machines – P. S. Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, McGraw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata McGraw-Hill Publishers.

COURSE OUTCOMES:

At the end of the course students, would be able to

1. Apply the basic RLC circuit elements and its concepts to networks and circuits.
2. Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3. Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4. Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5. Understand the basic LT Switch gear and calculations for energy consumption.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**
2/-/2/3

(R20A0301) COMPUTER AIDED ENGINEERING GRAPHICS

COURSE OBJECTIVES:

1. To learn basic engineering graphic communication skills &concept.
2. To learn the 2D principles of orthographic projections And Multiple views of the same
3. To know the solid Projection and Its Sectional Views
4. To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
5. To know the conversion of Orthographic Views to isometric Views And isometric to Orthographic views

UNIT-I

INTRODUCTION TO COMPUTER AIDED ENGINEERING GRAPHICS

Introduction, Drawing Instruments and their uses, BIS conventions, lettering Dimensioning & free hand practicing. AutoCAD User Interface – Menu system – coordinate systems, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, – tool bars (draw, modify, annotations, layers etc.) – status bar (ortho, grid, snap, iso etc.),

Generation of points, lines, curves, polygons, dimensioning, layers, blocks, electrical symbols.

Geometrical constructions

Curves Used in Engineering Practice

a) Conic Sections (General Method only- Eccentricity Method)
b) Cycloid, Epicycloid and Hypocycloid

UNIT-II:

2D PROJECTIONS

Orthographic Projections: – Conventions – First and Third Angle projections.

Projections of Points, Projections of Lines, Projections of planes, Circuits Designs **–** Basic Circuit Symbols & Sensors

UNIT– III

PROJECTIONS OF SOLIDS: Projections of regular solids prism and pyramid inclined to both planes.

SECTIONS OF SOLIDS: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone, True shapes of the sections.

UNIT– IV

3D PROJECTIONS

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views,

Commands for 3D UCS, Extrude, revolve, loft, 3D move, 3D rotate, dox, sphere, cone,wedge, cylinder, viewports. Plane Figures, Simple and Compound Solids. 3D models of electrical components Switch, Diode, Resistor, Battery, Capacitor, Transistor,Motor

UNIT– V

TRANSFORMATION OF PROJECTIONS: Visualize the 2D &3D View of Engineering Objects for Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects in AutoCAD

TEXT BOOKS:

1. Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers

REFERENCE BOOKS:

1. Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revisededition-2006.
2. Engineering Graphics - K.R. Gopalkrishna, 32nd edition, 2005- Subash Publishers Bangalore.

COURSE OUTCOMES:

After the completion of course the student will be capable to

1. Produce geometric construction, dimensioning & Curves and detail drawings.
2. Compile Projections of points, lines, planes then create virtual drawing by using computer
3. Sketch the Solid Projections & Sectioning of the solids
4. Develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. Understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R18A0502) PYTHON PROGRAMMING

COURSE OBJECTIVES:

1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and call them.
4. To use Python data structures –- lists, tuples, dictionaries.
5. To do input/output with files in Python.

UNIT I

INTRODUCTION TO PYTHON PROGRAMMING LANGUAGE: Introduction to Python Language and installation, overview on python interpreters, working with python, Numeric Data Types: int, float, Boolean, complex and string and its operations, Standard Data Types: List, tuples, set and Dictionaries, Data Type conversions, commenting in python.

UNIT II

VARIABLES AND OPERATORS: Understanding Python variables, Multiple variable declarations, Python basic statements, Python basic operators: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

UNIT III

CONTROL FLOW AND LOOPS: Conditional (if), alternative (if-else), chained conditional (if- elif -else), Loops: For loop using ranges, string, Use of while loops in python, Loop manipulation using pass, continue and break

UNIT IV

FUNCTIONS: Defining Your Own Functions, Calling Functions, passing parameters and arguments, Python Function arguments: Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lambda functions in python.

UNIT V

I/O AND ERROR HANDLING IN PYTHON: Introduction, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods introduction to Errors and Exceptions, Handling IO Exceptions, Run Time Errors, Handling Multiple Exceptions.

INTRODUCTION TO DATA STRUCTURES: What are Data structures, Types of Data structures, Introduction to Stacks and Queues.

TEXT BOOKS

1. R. Nageswara Rao, “Core Python Programming”, dreamtech
2. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist ‘‘, 2ndedition, Updated for Python 3, Shroff/O ‘Reilly Publishers,2016.
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
4. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCEBOOKS:

1. Core Python Programming, W. Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into functions.
4. Represent compound data using Python lists, tuples, dictionaries.
5. Read and write data from/to files in Python Programs

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**
-/-/4/2

(R20A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on the production and practice of sounds of the English language and familiarizes the students with its use in everyday situations and contexts.

COURSE OBJECTIVES:

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language Communication Skills Lab has two parts:

A. Computer Assisted Language Learning (CALL)Lab
B. Interactive Communication Skills (ICS)Lab

The following course content is prescribed for the English Language Communication Skills Lab

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants-Transcriptions

ICS Lab: Ice-Breaking activity - JAM session

UNIT –II

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers

ICS Lab: Situational Dialogues/Role Plays-–Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

UNIT–III

CALL Lab: Syllable and Syllabification

ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

UNIT –IV

CALL Lab: Word Stress and Intonation

ICS Lab: Information transfer – from visual to verbal - maps, charts, tables and graphs

UNIT –V

CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)

ICS Lab: Making a Short Speech - Extempore

ELCS Lab:

1. **Computer Assisted Language Learning (CALL)Lab:**
   The computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
   System Requirement (Hardware component):
   Computer network with LAN with minimum 60 multimedia systems with the following specifications:
   i) P –IV Processor
   a) Speed –2.8GHZ
   b) RAM –512 MB Minimum
   c) Hard Disk –80 GB
   ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab:**
   A Spacious room with movable cha i rs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

COURSE OUTCOMES:

After completion of the course the students will be able to:

1. Learn with precision through computer-assisted individualized and independent language learning to work independently in an engineering set-up.
2. Improve conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
3. Acquire accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
4. Imbibe appropriate use of language in situations where one works as an individual and as a leader/team player.
5. Display professional behaviors and body language.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**

-/-/3/1.5

(R20A0281) BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

1. To design electrical systems.
2. To analyze a given network by applying various network theorems.
3. To expose the students to the operation of DC generator.
4. To expose the students to the operation of dc motor and transformer.
5. To examine the self-excitation in DC generators.

CYCLE – I

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

CYCLE -II

7. Magnetization characteristics of DC shunt generator.
8. Swinburne's test on DC shunt machine.
9. Brake test on DC shunt motor.
10. OC &SC tests on single phase transformer.
11. Load test on single phase transformer.

NOTE: Any 10 of above experiments are to be conducted

COURSE OUTCOMES:

At the end of the course, students would be able to

1. Calculate the branch currents and mesh voltages by conducting KCL and KVL test on given circuit.
2. Prove the various circuit theorems like Superposition, Thevenin's, Norton's, Maximum power transfer and Reciprocity theorems.
3. Plot the Magnetization characteristics of DC shunt generator.
4. Plot the characteristics of DC shunt motor by conducting Brake Test.
5. Determine the Efficiency of single-phase transformer by conducting OC, SC and Load tests

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**

-/-/3/1.5

(R20A0582) PYTHON PROGRAMMING LAB

COURSE OBJECTIVES:

1. Syntax and Semantics and create Functions in Python.
2. Different data types Lists, Dictionaries in Python.
3. how to execute the programs using loops and control statements
4. Decision Making and Functions in Python
5. Files and exception Handling in Python

Week 1:

A) Write python program to print HelloWorld

B) Write a python program to get string, int, float input from user

C) Write a python program to add 2numbers

Week 2:

A) Create a list and perform the following methods

1) Insert () 2) remove () 3) append () 4) len () 5) pop () 6) clear ()

B) Write a python program to find the length of list?

C) Write a python program to find the smallest and largest number in the list?

Week 3:

A) Create a tuple and perform the following methods

1) Add items 2) len () 3) check for itemintuple 4) Access items

B) Write a python program using the following methods: 1) count 2) index

C) Write a python program using “+” and “*” operations which resulting a new tuple?

Week 4:

A) Create a dictionary and apply the following methods

1) Print the dictionary items 2) access items 3) use get () 4) change values 5) uselen ()

B) Write a python code to convert list of tuples into dictionaries?

C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

Week 5:

A) Write a python program to perform arithmetic, assignment, logical and comparison operators?

B) Write a Python program to add two positive integers without using the '+' operator. (Use bitwise operator)

C) Write a Python program to perform the basic four operators (+, -, *, /)

Week 6:

A) Write a simple python program to declare a variable in different possible ways?
B) Write a python program to show precedence of operators using the expression: z = (v+w) * x /y
C) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation?

Week 7:

A) Write a python program to print a number is positive/negative using if-else.
B) Write a python program to find largest number among three numbers.
C) Write a python Program to read a number and display corresponding day using if_elif_else?
D) Write a python program to print list of numbers using range and for loop

Week 8:

A) Write a python code to print the sum of natural numbers using while loop?
B) Write a python program to print the factorial of given number?
C) Write a python program to find the sum of all numbers stored in a list using for loop?

Week 9:

A) Write a Python function that takes two lists and returns True if they are equal otherwise false
B) Write python program in which an function is defined and calling that function prints Hello World
C) Write python program in which a function (with single string parameter) is defined and calling that function prints the string parameters given to function.
D) Write a python program using with any one of python function argument?

Week 10:

A) Write a program to double a given number and add two numbers using lambda ()?
B) Write a program for filter () to filter only even numbers from a given list.
C) Write a program for map () function to double all the items in the list?
D) Write a program to find sum of the numbers for the elements of the list by using reduce ()?

Week 11:

A) Write a python program to open and write “hello world” into a file?
B) Write a python program to write the content “hi python programming” for the existing
file.
C) Write a python program to read the content of a file?

Week 12:

A) Write a program to implement stack using array.
B) Write a program to implement Queue using array.

TEXT BOOKS:

1. R. Nageswara Rao, “Core Python Programming”, dreamtech
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second Edition, Updated for Python 3, Shroff/O’Reilly Publishers,2016.

COURSE OUTCOMES:

After completion of the course, Students will be able to**:**

1. Evaluate Problem solving and programming capability
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
3. Implement conditional and loop for python programs
4. Express different Decision-Making statements and Functions
5. Understand and summarize different File handling operations and exceptions

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I YEAR B. Tech EEE– II SEM **L/T/P/C**
2/-/-/-

(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence.
3. A holistic perspective forms the basis of value-based living in a natural way.
4. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful
5. Mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT - I:

COURSE INTRODUCTION - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.
Self-Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self-exploration. Continuous Happiness and Prosperity
A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.
Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

UNDERSTANDING HARMONY IN THE HUMAN BEING - Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.
Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values inrelationship.
Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhundzada), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:
UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.
Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:
IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a. Ability to utilize the professional competence for augmenting universal human order.
b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rdEdition.

REFERENCE BOOKS:

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986,1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik)Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer& Robert L. Berry, 2000, Fundamentals of Ethics for Scientists &Engineers, Oxford University Press.

10. M Govindarajan, S Natrajan& V. S Senthil Kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

1. The students will be able to obtain happiness and prosperity in their life.
2. The students will develop harmony at all levels.
3. The students can have satisfying human behavior throughout their life.
4. The students can have a holistic perspective forms the basis of value-based living in a natural way.
5. The students can appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0023) MATHEMATICS –III

COURSE OBJECTIVES:

1. The expansion of a given function by Fourier series.
2. The Fourier sine and cosine transforms, properties, inverse transforms, and finite Fourier transforms.
3. Differentiation and integration of complex valued functions. Evaluation of integrals using Cauchy's integral formula.
4. Taylor's series, and Laurent's series expansions of complex functions, evaluation of integrals using residue theorem.
5. Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification-rotation, reflection-inversion, and Properties of bilinear transformations.

UNIT – I: FOURIER SERIES

Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2π.Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine expansions-Fourier series in an arbitrary interval.

UNIT – II: FOURIER TRANSFORMS

Fourier integral theorem - Fourier sine and cosine integrals, Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III: ANALYTIC FUNCTIONS

Complex functions and its representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem (singly and multiply connected regions) – Cauchy's integral formula – Generalized integral formula.

UNIT – IV: SINGULARITIES AND RESIDUES

Radius of convergence – Expansion in Taylor's series, Laurent's series. Singular point – Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

Improperrealintegrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(cos\Theta, sin\Theta)d\Theta$

UNIT – V: CONFORMAL MAPPINGS

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation; Magnification and rotation; Inversion and reflection,

Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2. Higher Engineering Mathematics by Ramana B.V, Tata Mc Graw Hill.
3. Complex Variables: Theory and Applications by H. S Kasana.

REFERENCES:

1. Complex Variables by Murray Spiegel, Seymour Lipschitz, et al. by Schaum's outlines series.
2. Advanced Engineering Mathematics by Kreyszig, John Wiley &Sons.
3. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.

COURSE OUTCOMES:

After learning the concepts of this paper, the student will be able to

1. Find the expansion of a given function by Fourier series in the given interval and hence this concept can be used in the analysis of signals.
2. Find Fourier sine, cosine transforms and inverse transformations; hence this concept can be used in designing electrical circuits, signal processing and image processing etc.
3. Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
4. Find the Taylor's and Laurent series expansion of complex functions and solution of improper integrals can be obtained by Cauchy's-Residue theorem.
5. Understand the conformal transformations of complex functions can be dealt with ease and which can be used in different physical situations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0202) ELECTRICAL MACHINES -I

COURSE OBJECTIVES:

1. To understand the basic working principle, constructional details and operational features of DC Generators.
2. To study and understand the various characteristics DC Generators.
3. To learn the various methods of speed control of DC Motors.
4. To introduce the concept of regulation and its calculations.
5. To learn the concepts of single phase and three phase transformers circuits

UNIT – I

D.C GENERATORS: Principle of operation - constructional features - Action of commutator – armature windings **(**overview only) use of laminated core – E.M.F Equation – Problems, Armature reaction – Cross magnetizing and de-magnetizing AT/pole methods of overcoming AR effects. Methods of Excitation – separately excited and self- excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excite and remedial measures. Load characteristics of shunt, series and compound generators

UNIT – II

D.C. MOTORS: Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction. Speed control of D.C. Motors - Armature voltage and field flux control methods. Motor starters, & their need, 3 point Starter.

UNIT – III

TESTING OF D.C. MACHINES: Losses – Constant & Variable losses – calculation of efficiency condition for maximum efficiency. Methods of Testing – direct, indirect and regenerative testing – brake test – Swinburne's test – Hopkinson's test – Field's test.

UNIT – IV

SINGLE PHASE TRANSFORMERS: Principle of operation - constructional features -Types - minimization of hysteresis and eddy current losses- EMF equation - operation on no load and on load - phasor diagrams. Equivalent circuit - losses and efficiency – regulation - All day efficiency.

UNIT-V

TESTING OF TRANSFORMERS AND POLY-PHASE TRANSFORMERS: OC and SC tests - Sumpner's test - predetermination of efficiency and regulation- parallel operation with equal and unequal voltage ratios - auto transformers- equivalent circuit -Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ.

TEXT BOOKS:

1. Electric machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, McGraw Hill Companies,

2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,2004.

3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.

REFERENCE BOOKS:

1. Electric Machinery Fundamentals, Stephen J. Chapmen, Tata McGraw –Hill Publishers.

2. A. S. Langsdorf, "Alternating current machines", McGr*aw Hill Education*, *1984*.

3. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007.

4. Electrical Machines, P.S. Bimbra, Khanna Publishers.

5. Electric Machines by I.J. Nagrath& D.P. Kothari, Tata McGraw –Hill Publishers.

COURSE OUTCOMES:

At the end of this course the student would get

1. Explain the Constructional features of DC Generators, DC motors and transformers.
2. Understand different excitation and starting methods of DC machines.
3. Summarize Testing of different types of DC Generators and DC motors.
4. Carry out different testing methods and assess the performance of transformers.
1. 5. Analyze single phase and three phase transformers.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0204) ELECTRO MAGNETIC FIELDS

COURSE OBJECTIVES:

1. To introduce the concepts of electric field, magnetic field.
2. To Analyze Maxwell's equation in different forms in Electrostatic, Magnetic time varying fields.
3. To solve the problems in different EM fields.
4. To analyze moving charges in Magnetic fields.
5. To understand electric and magnetic fields in the development of theory for electrical machines.

UNIT – I

ELECTROSTATICS: Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Potential gradient – Gauss's law– Application of Gauss's Law – Maxwell's first law, div (D)=ρv – Laplace's and Poison's equations.

UNIT – II

DIELECTRICS & CAPACITANCE: Behavior of conductors in an electric field – Conductors and Insulators – Dielectric boundary conditions – Capacitance – Capacitance of parallel plates– spherical co-axial capacitors—– Current density – conduction and Convection current densities -Ohm's law in point form – Equation of continuity

UNIT – III

MAGNETO STATICS: Static magnetic fields – Biot-Savart's law – Magnetic field intensity (MFI)– MFI due to a straight current carrying filament – MFI due to circular, current Carrying wire – Relation between magnetic flux and magnetic flux density –Maxwell's second Equation, div(B)=0, Ampere's circuital law and its applications viz – Point form of Ampere's circuital law -Maxwell's third equation, Curl (H)=Jc

UNIT – IV

FORCE IN MAGNETIC FIELDS AND MAGNETIC POTENTIAL: Magnetic force Moving charges in magnetic field – Lorentz force equation – Self and Mutual inductance – determination of self-inductance of a solenoid and toroid – energy stored and density in a magnetic field.

UNIT – V

TIME VARYING FIELDS: Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-dB/dt – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current.

TEXT BOOKS:

1. "William H. Hayt& John. A. Buck", "Engineering Electromagnetic", Mc. Graw- Hill Companies, 7thEdition,2009.
2. "Sadiku", "Electromagnetic Fields", Oxford Publications, 4th Edition,2009.

REFERENCE BOOKS:

1. "CR Pauland S. A. Nasar", "Introduction to Electromagnetic", McGraw Hill Publications,3rd Edition, 1997.
2. "Nathan Ida", "Engineering Electromagnetic", Springer (India) Pvt. Ltd. 2nd Edition, 2015.
3. "DJG riffiths", "Introduction to Electro Dynamics", Prentice-Hall of India Pvt. Ltd,3rdedition, 1999.
4. "J. DKraus", "Electro magnetics", Mc Graw-HillInc. 4th edition, 1992.

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. To understand the basic laws of electro magnetism.
2. To obtain the electric and magnetic fields for simple configurations under static conditions.
3. To analyze time varying electric and magnetic fields.
4. To understand Maxwell's equation in different forms and different media.
5. To understand the Faraday's law of Electromagnetic induction.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0205) CONTROL SYSTEMS

COURSE OBJECTIVES:

1. To learn the basic principles of control system, transfer function representation using block diagram and signal flowgraph.
2. To analyze the time response and the effect of different controllers.
3. To study and analyze the different methods of stability in time domain.
4. To understand the frequency domain specifications and different methods of stability in frequency domain.
5. To learn the basic concepts of state space analysis and solutions to time invariant state equations.

UNIT - I:

INTRODUCTION: Concept of control system, Classification of control systems - Open loop and closed loop control systems, Differences, Examples of control systems- Effects of feedback, Feed Back Characteristics.

TRANSFER FUNCTION REPRESENTATION: Block diagram algebra, determining the Transfer function from block diagrams, Representation by Signal flow graphs - Reduction using Mason's gain formula – Transfer function of SFG's.

UNIT - II:

TIME RESPONSE ANALYSIS: Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response, Steady state errors and error constants. PID controllers, Effects of proportional derivative, Proportional integral systems on steady state error.

UNIT - III:

STABILITY ANALYSIS IN S-DOMAIN: The concept of stability – Routh-Hurwitz's stability criterion - Qualitative stability and conditional stability – Limitations of Routh- Hurwitz's stability.

ROOT LOCUS TECHNIQUE: Concept of root locus - Construction of root locus.

UNIT - IV:

FREQUENCY RESPONSE ANALYSIS: Introduction, Frequency domain specifications, Bode plot diagrams-Determination of Phase margin and Gain margin, Stability analysis from Bode plots, Polar plots.

UNIT - V:

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: Concepts of state, state variables and state model, Derivation of state models from block diagrams, Diagonalization, Solving the time invariant state equations, State Transition Matrix and its properties, Concepts of Controllability and Observability.

TEXT BOOKS:

1. Control Systems Engineering by I.J. Nagrat hand M. Gopal,New Age International (P) Limited, Publishers.
2. Control Systems by Anand Kumar, PHI.
3. Control Systems Engineering by A. Nagoor Kani, RBA Publications.

REFERRENCE BOOKS:

1. Control Systems Theory and Applications by S. K. Bhattacharya, Pearson.
2. Control Systems Engineering by Palani, TMH.
3. Control Systems by N. K. Sinha, New Age International (P) Limited Publishers.
4. Control Systems by S. Hasan Saeed, KATSONBOOKS
5. Solutions and Problems of Control Systems by A.K. Jairath, CBS Publishers.

COURSE OUTCOMES:

At the end of this course, students would be able to:

1. Explain the basic principles of control system, transfer function representation using block diagram and signal flowgraph.
2. Analyze the time response and effect of different controllers.
3. Study the different methods of stability in time domain.
4. Analyze the frequency domain specifications and stability methods in frequency domain.
5. Explain the basic concepts of state space analysis and solutions to time invariantstate equations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0206) ELECTRICAL CIRCUITS ANALYSIS

COURSE OBJECTIVES:

1. To understand the concept of DC Transient and AC Transient analysis.
2. To learn the various connections of 3-phasecircuits.
3. To study the locus diagrams of series and parallel combination of R-L, R-C and R-L-C circuits.
4. To evaluate network parameters of given electrical network.
5. To study and understand the concept of resonance and magnetic circuits.

UNIT-I

TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C circuits (Series and parallel combinations) for D.C. excitations, Initial conditions, Solution using differential equation and Laplace transform method.

UNIT -II

TRANSIENT ANALYSIS: Transient response of R-L, R-C, R-L-C Series circuits for sinusoidal excitations, Initial conditions, Solution using differential equation and Laplace transform method.

UNIT - III

THREE PHASE CIRCUITS: Phase sequence, Star and delta connection, Relation between line and phase voltages and currents in balanced systems, Analysis of balanced and unbalanced three phase circuits

UNIT – IV

LOCUS DIAGRAMS & RESONANCE: Series and Parallel combination of R-L, R-C and R-L-C circuits with variation of various parameters. Resonance for series and parallel circuits, concept of band width and Q factor.

UNIT - V

NETWORK PARAMETERS: Two port network parameters – Z, Y, ABCD and hybrid parameters. Condition for reciprocity and symmetry. Conversion of one parameter to other, Interconnection of Two port networks in series, parallel and cascaded configuration and image parameters.

TEXT BOOKS:

1. William HartHayt, Jack Ells worth Kemmerly, Steven M. Durbin (2007), EngineeringCircuit Analysis, 7th edition, McGraw-Hill Higher Education, New Delhi, India
2. Josepha. Edminister (2002), Schaum' soutline of Electrical Circuits, 4th edition, TataMcGraw Hill Publications, New Delhi, India.

3. A. Sudhakar, Shyammohan S. Palli (2003), Electrical Circuits, 2ndEdition, Tata Mc Graw Hill, New Delhi

REFERENCE BOOKS:

1. L. Wadhwa (2008), Electric Circuits Analysis, 2nd edition, New Age International Publications, New Delhi.
2. A. Chakrabarty (2010), Circuit Theory, 5thedition, Dhan pat Rai & Sons Publications, New Delhi.
3. Van Valkenburg, M. E. (1974), Network Analysis, 3rd Edition, Prentice Hall of India, New Delhi.
4. A Text Book on Electrical Technology. –B L THERAJA, Vol 1, S. Chand Publications.

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. Analyze the transient and steady-state response of electrical circuits.
2. Explain the importance of 3-phase circuits with star and delta connected balanced and unbalanced loads.
3. Analyze the behavior of series and parallel R-L-C circuits at resonance.
4. Explain the basics of magnetic circuits and locus diagrams of R-L, R-C series circuits.
5. Study the different types of two port network parameters.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0410) LINEAR AND DIGITAL ICs

COURSE OBJECTIVES:

The main objectives of the course are:

1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non-linear applications of operational amplifiers.
3. To introduce the theory and applications of analog multipliers and PLL.
4. To teach the theory of ADC and DAC.
5. To introduce the concepts of wave form generation and introduce some special functionICs.

UNIT – I:

OPERATIONAL AMPLIFIER: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation – Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 voltage Regulator.

UNIT – II:

OP-AMP, IC-555 & IC 565 APPLICATIONS: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, waveform Generators – Triangular, Sawtooth, Square wave, IC555 Timer – Functional Diagram, Monostable and A stable Operations, Applications, IC565 PLL – Block Schematic, Description of Individual Blocks, Applications.

UNIT – III:

DATA CONVERTERS: Introduction, Basic DAC techniques, Different types of DACs-Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs – Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT – IV:

DIGITAL INTEGRATED CIRCUITS: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate.

COMBINATIONAL LOGIC ICS – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs –Code Converters, Decoders, Encoders, Priority Encoders, Multiplexers, De-multiplexers, Parity Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT – V:

SEQUENTIAL LOGIC IC'S AND MEMORIES: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

MEMORIES – ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,2003.
3. Digital fundamentals – Floyd and Jain, Pearson Education,8th Edition,2005

REFERENCES BOOKS:

1. Op Amps & Linear Integrated Circuits-Concepts and Applications James M. Fiore, Cengage Learning/Jaico,2009.
2. Operational Amplifiers with linear integrated circuits by K. Lalkishore-Pearson,2009.
3. Linear integrated circuits and applications-Saliva Hana, TMH.
4. Modern digital electronics-RPJain-4/e-TMH,2010.
5. Digital design principles and practices-John. F. Wakerly3/e,2005.
6. Operational amplifiers with linear integrated cuircuits,4/e William D. Stanley, PearsoneducationIndia,2009.

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Also, students will be able to design circuits using operational amplifiers forvarious applications.
3. Understanding of the different families of digital integrated circuits and their characteristics.
4. Understanding of D/A and A/DC converters.
5. Design of combinational and sequential circuits using the TTL & CMOSICs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

-/-/3/1.5

(R20A0466) ANALOG AND DIGITAL ELECTRONICS LAB

COURSE OBJECTIVES:

1. To identify and test R, L & C components, potentiometers, breadboards, Diodes, BJTs,Power Transistors, LEDs, Multimeters, RPS, CRO and Function Generators.
2. To conduct experiments and plot the characteristics pn diode, Zener diode characteristics
3. To conduct experiment and plot input and output characteristics of BJT and FET in different configurations.
4. To study and verify Basic Gates (AND, OR & NOT), Universal Gates (NAND & NOR) and implement Boolean Functions using the gates.
5. To realize Digital Circuits and analyze Op-amp for various applications.

PART A:

Only For Viva- Voice Examination Electronic Work Shop Practice (In ONE Lab Session)

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Bread Boards.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Power Transistors, LED's.
3. Study and operation of
   i. Multi meters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO.

PART B:

(For Laboratory Examination – Minimum of 10 experiments)

1. P-N junction diode forward and reverse bias characteristics
2. Zener diode characteristics
3. Input and output characteristics of a BJT in CE configuration
4. Input and output characteristics of a BJT in CB configuration
5. FET Characteristics
6. Study and verification of Basic Gates (AND, OR &NOT)
7. Study and verification of Universal Gates (NAND &NOR)
8. Implementation of the given Boolean function using logic gates
9. Realization of Half Adder& Full Adder using Basic gates
10. Realization of Half subtractor & Full subtractor using Basic gates
11. Multiplexer and Demultiplexer
12. Encoder and Decoder
13. Op-amps (using IC 747): Summer, Integrator and Differentiator

COURSE OUTCOMES

1. Identifying and testing R, L& C components, potentiometers, breadboards, Diodes, BJTs, Power Transistors, LEDs, Multimeters, RPS, CRO and Function Generators.
2. Conducting experiments and plotting the characteristics PN diode, Zener diode characteristics
3. Conducting experiment and plotting input and output characteristics of BJT and FET in different configurations.
4. Studying and verifying Basic Gates (AND, OR & NOT), Universal Gates (NAND & NOR) and implement Boolean Functions using the gates.
5. Realizing Digital Circuits and analyze Op-amp for various applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

-/-/3/1.5

(R20A0282) ELECTRICAL CIRCUITS LAB

COURSE OBJECTIVES:

1. To learn the various connections of 3-phasecircuits.
2. To understand the concept Locus Diagrams of RL and RC Series Circuit
3. To study the Z and Y Parameters of two Portnet works.
4. To study and understand the Transmission (ABCD) and Hybrid parameters of given electrical network.
5. To Learn how to use the PSPICE software for simulating circuits

PART A

1) Millman's Theorem
2) Locus Diagrams of RL and RC Series Circuits
3) Series and Parallel Resonance
4) Z and Y Parameters
5) Transmission (ABCD) and Hybrid parameters
6) Measurement of Active Power for Star and Delta connected balanced loads
7) Measurement of Reactive Power for Star and Delta connected balanced loads

PART-B

PSPICE SIMULATION

1) Simulation of DC Circuits
2) DC Transient response
3) Mesh Analysis
4) Nodal Analysis

Note: Conduct any 6 Experiments from PART- A& PART- B is Mandatory

COURSE OUTCOMES:

At the end of this course the students would be able to:

1. Analyze a given network by applying millman's Theorem.
2. Explain the basics of Series and Parallel Resonance.
3. To study the Transmission (ABCD) and Hybrid parameters of two port networks.
4. Explain clearly the calculations of three phase Active and Reactive power for Star and Delta connected balanced load.
5. Design and simulate a basic DC circuit using Spice.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– I SEM **L/T/P/C**

2/-/-/-

(R20A0008) GLOBAL EDUCATION AND PROFESSIONAL CAREER

INTRODUCTION

In every era of human life, studying abroad has allowed one to experience another part of oneself in a different setting. Additionally, if all that hurry is geared towards success in one's career, international education will most definitely be worth one's time. It is not only an expedition of self-discovery but also an investment in one's resume.

The world, today, is redefining knowledge and great leadership to encompass critical values that are key to meeting modern career challenges. To meet the current requirements, a study delineating Global Education is of utmost importance towards prospective growth.

COURSE OBJECTIVES:

1. To assist students to understand the broad scope of engineering.
2. To equip the students to study the academic subjects with better perspective of the expectations of the international standards
3. To familiarize students with the financial requirements and ways to receive monetary aid
4. To enable students' understanding of the various admission tests
5. To acquaint them with their own skill set and train the students towards skills development

UNIT 1

Importance and relevance of Engineering in todays and futuristic contexts.

The jobs that will thrive in the market in the coming decades. For eg., Robot Manufacturer &service Management, Big Data & AI Scientists, Artificial Bodies Manufacturer, Gene Designers, etc

UNIT 2

Countries and their entry requirements

Non-immigrant student visas, Work Permit visas

UNIT 3

Admission tests to colleges and universities world-

over PSAT, SAT, TOEFL, AP, IELTS…

UNIT 4

Financial capacity requirements

Scholarships, Full scholarships, merit scholarships, on-campus jobs

UNIT 5

Skills Mapping

Match one's skills with jobs, Skills development

COURSE OUTCOMES

After completion of the course, the students will be able to:

1. Comprehend the usage of engineering in various fields and disciplines.
2. Identify the right college and country to pursue higher education.
3. Prepare themselves for the skill-oriented academics and prospective growth.
4. Plan for their future education with the precise financial management.
5. Discover and discuss their skill set and the jobs that map their skills.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**

3/-/-/3

(R20A0024) PROBABILITY AND STATISTICS

COURSE OBJECTIVES:

1. To identify a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
2. To learn important probability distributions like: in the discrete case, study of the Binomial and the Poisson Distributions and in the continuous case the Normal Distributions.
3. To build the linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
4. To interpret the types of sampling, sampling distribution of means and variance, Estimations of statistical parameters.
5. To give comprehensive knowledge of probability theory to make inferences about a population from large and small samples.

UNIT – I:

RANDOM VARIABLES: Single Random Variables -Discrete and Continuous, Probability distribution function, Probability mass and density functions, mathematical expectation and variance. Multiple Random variables: Discrete and Continuous, Joint probability distribution, Marginal probability density functions, conditional probability distribution function and density functions.

UNIT-II:

PROBABILITY DISTRIBUTIONS: Binomial distribution – properties, mean, variance and recurrence formula for Binomial distribution, Poisson distribution – Poisson distribution as Limiting case of Binomial distribution, properties, mean variance and recurrence formula for Poisson distribution, Normal distribution – mean, variance, median, mode and characteristics of Normal distribution.

UNIT -III:

CORRELATION AND REGRESSION: Correlation -Coefficient of correlation, Rank correlation, Regression- Regression coefficients, Lines of regression. Multiple correlation and regression- Coefficient of multiple Correlation, multiple regression, multiple linear regression equations.

UNIT –IV:

SAMPLING AND TESTING OF HYPOTHESIS FOR LARGE SAMPLES: Sampling: Definitions - Types of sampling - Expected values of sample mean and variance, Standard error - Sampling distribution of means and variance. Estimation - Point estimation and Interval estimation.

TESTING OF HYPOTHESIS: Null and Alternative hypothesis - Type I and Type II errors, Critical region - confidence interval - Level of significance, One tailed and two tailed test.
LARGE SAMPLE TESTS: Test of significance - large sample test for single mean, difference of means, single proportion, and difference of proportions.

UNIT-V:

TESTING OF HYPOTHESIS FOR SMALL SAMPLES: Small samples: Test for single mean, difference of means, paired t-test, test for ratio of variances (F-test), Chi- square test for goodness of fit and independence of attributes.

TEXT BOOKS:

1. Fundamental of Statistics by S.C. Gupta,7thEdition,2016.
2. Fundamentals of Mathematical Statistics by SC Gupta and V. K. Kapoor
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 35thEdition,2000.

REFERENCES BOOKS:

1. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross.
2. Probability and Statistics for Engineers by Dr. J. Ravichandran

COURSE OUTCOMES:

After completion of the course, the student will be able to

1. Evaluate randomness in certain realistic situation which can be either discrete or continuous type and compute statistical constants of these random variables.
2. Provide very good insight which is essential for industrial applications by learning probability distributions.
3. Higher up thinking skills to make objective, data-driven decisions by using correlation and regression.
4. Assess the importance of sampling distribution of a given statistic of a random sample.
5. Analyze and interpret statistical inference using samples of a given size which is taken from a population.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R20A0203) ELECTRICAL MACHINES – II

COURSE OBJECTIVES:

- To understand the basic working principle, constructional details and operational features of polyphase induction motors.
- To study and understand the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities.
- To study the concept of parallel operation of alternators.
- To learn the speed control methods of polyphase induction motors.
- To learn different types of single-phase Induction motors universal motor, stepper motor and shaded pole motor which are having significant applications in household appliances, industrial applications and control systems.

UNIT-I

POLYPHASE INDUCTION MOTORS: Construction details of cage and wound rotor machines-production of a rotating magnetic field – principle of operation – rotor emf and rotor frequency – rotor reactance, rotor current and Power factor at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation – expressions for maximum torque and starting torque – torque slip and speed characteristics –equivalent circuit – phasor diagram.

UNIT-II

INDUCTION MOTORS: TESTING, STARTING & SPEED CONTROL METHODS: No load and blocked rotor tests-predetermination of performance-methods of starting and starting current and torque calculations. Speed control methods: change of voltage, change of frequency, change of poles and methods of consequent poles; cascade connection. Injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation **(Overview only).**

UNIT-III

SYNCHRONOUS MACHINES: Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors –E.M.F Equation. Armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics. Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method

UNIT-IV

PARALLEL OPERATION OF SYNCHRONOUS MACHINES: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input.

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. hunting and its suppression– Methods of starting.

UNIT-V

SINGLE PHASE & SPECIAL PURPOSE MOTORS: Single phase induction motor – Constructional Features-Double revolving field theory Equivalent circuit - split-phase motors - Capacitor start Capacitor run motors. Principles of A.C. Series Motor-Universal motor, Reluctance motor, Hysteresis motor, Stepper motor, Brushless DC motor and AC motor, Shaded pole motor (Qualitative Treatment Only).

TEXT BOOKS:

1. Electric Machinery Fundamentals, Stephen J. Chapmen, Tata Mc Graw –Hill Publishers.
2. Electrical machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw –Hill Publishers

REFERENCE BOOKS:

1. Electrical Machines, P.S. Bimbra, Khanna Publishers
2. Performance and design of A.C. Machines by M.G.Say, ELBS

COURSE OUTCOMES:

After this course the student gets a thorough knowledge on:

1. Explain the speed-torque characteristics of 3-phase induction motors.
2. Explain clearly the starting and speed control methods of 3-phase induction motors.
3. Analyze the performance characteristics of synchronous machines.
4. Study the operation and characteristics of single-phase motors & special machines.
5. Apply the above concepts to real-world electrical problems and applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R20A0207) POWER SYSTEM – I

Prerequisite: Basic Electrical Engineering, Electrical Machines-I, Electrical Machines-II

COURSE OBJECTIVES:

1. To understand the different types of power generating stations.
2. To understand the concepts of overhead line insulators.
3. To illustrate the economic aspects of power generation and tariff methods.
4. To evaluate the transmission line parameters calculations
5. To understand the concept of corona

UNIT-I:

GENERATION OF ELECTRIC POWER: Conventional Sources: Hydro station, Steam Power Plant, Nuclear Power Plant.

Non-Conventional Sources (Qualitative Treatment only): Ocean Energy, Tidal Energy, Wind Energy, Fuel Cells, & Solar Energy, Cogeneration --Energy conservation and storage.

UNIT-II:

ECONOMICS OF GENERATION: Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants. Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.

UNIT-III:

TRANSMISSION LINE PARAMETERS: Types of conductors – Inductance due to Internal and external fluxes of the conductor, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductors-transposition, bundled conductors (Qualitative), concept of GMR & GMD, Numerical Problems on Inductance and Capacitance.

CORONA: Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss and methods of reducing corona loss, Disadvantages of corona, interference between power and Communication lines.

UNIT-IV:

PERFORMANCE OF TRANSMISSION LINES: Representation of lines, short transmission lines, medium length lines, nominal T and PI- representations, and long transmission lines (Rigorous Solution Method). The equivalent circuit representation of a long Line A, B, C, D constants, Ferranti Effect, Skin and Proximity effects, concept of Surge Impedance, Numerical Problems.

UNIT-V:

OVERHEAD LINE INSULATORS: Introduction, types of insulators, Potential distribution over a string of suspension insulators, String Efficiency, Methods of equalizing the potential, Grading of insulators - Capacitance grading and Static Shielding. Numerical Problems on insulators

TEXT BOOKS:

1. W.D. Stevenson –Elements of Power System Analysis, Fourth Edition, Mc Graw Hill, 1984.
2. C.L. Wadhwa –Generation, Distribution and Utilization of Electrical Energy, Second Edition, New Age International,2009.

REFERENCE BOOKS:

1. C.L. Wadhwa –Electrical Power Systems, Fifth Edition, New AgeInternational,2009
2. M.V. Deshpande –Elements of Electrical Power Station Design, Third Edition, WheelerPub.1998
3. H. Cotton& H. Barber-The Transmission and Distribution of Electrical Energy, Third "V.K Mehta and Rohit Mehta", "Principles of Power Systems", S. Chand & Company Ltd, NewDelhi,2004.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

1. Assess the functioning of conventional and non-Conventional generating stations.
2. Understand the concepts of economics of generation like power tariff methods.
3. Analyze and evaluate the transmission line parameters.
4. Determine the performance of transmission lines using various solution methods
5. Understand the concepts of overhead line insulators and corona.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R20A0210) ELECTRICAL MEASUREMENTS & INSTRUMENTATION

COURSE OBJECTIVES:

- To introduce the basic principles of all Electrical measuring instruments
- To deal with the measurement of voltage, current, Power factor, power, energy, etc.
- To understand the basic principle of Transducers.

UNIT–I

INTRODUCTION TO MEASURING INSTRUMENTS: Classification of Instrument – deflecting, controlling and damping torques – Ammeters and Voltmeters – PMMC, moving iron, Electrostatic, induction type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range of instruments.

UNIT–II

MEASURMENT OF POWER & ENERGY: Single phase dynamometer wattmeter – Expression for deflecting and control torques, Measurement of active and reactive power in balanced and unbalanced systems, power factor meters, Single phase induction type energy meter – driving and braking torques – errors and compensations.

UNIT–III

DC, AC BRIDGES: Methods of measuring low, medium and high resistance – sensitivity of wheat- stone's bridge –Kelvin's double bridge for measuring low resistance. Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge. Measurement of capacitance and loss angle – Desaunty's Bridge – Wien's bridge – Schering Bridge.

UNIT – IV

D.C & A.C POTENTIOMETERS, INSTRUMENT TRANSFORMER: Principle and operation of D.C. Crompton's potentiometer standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar type and standardization – application. CT and PT applications.

UNIT–V

TRANSDUCERS: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principal operation of LVDT and capacitor transducers, LVDT Applications.

TEXT BOOKS:

1. A. K. Sawhney", "Electrical & Electronic Measurements", Dhan pat Rai &Co. Publications, 2005.
2. "G. K. Banerjee", "Electrical & Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016
3. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements ", BS Publications, 2012.

REFERENCEBOOKS:

1. "R. K. Rajput", "Electrical & Electronic Measurements & Instrumentation", S. Chand and Company Ltd., 2007.
2. "Buckingham and Price", "Electrical Measurements", Prentice – Hall. 1988.
3. "Reiss land, M.U", "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
4. "E. W. Golding and F. C. Widdis", "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2015.

COURSE OUTCOMES:

After completion of this course, the students will be able to

- Understand different types of measuring instrument, their construction,operation and characteristics
- Identify the instruments suitable for typical measurements
- Apply the knowledge about transducers and instrument transformer to usethem practically and effectively.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R20A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

1. To learn the basics of Economic concepts and through analysis of firms' demand.
2. To understand various concepts of firms' production and cost analysis.
3. To understand various market structures and pricing policies off rim switch distinctive forms of business.
4. To know about accounting procedure of the firm.
5. To develop a significant perspective about investment decision process and complete analysis of the company using ratios.

UNIT-I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

ELASTICITY OF DEMAND: Definition, Types, Measurement and Significance of elasticity of Demand.

DEMAND FORECASTING: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judge mental Approach, and Time Series Analysis).

UNIT-II

PRODUCTION & COST ANALYSIS: Production Function- Is cost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

COST ANALYSIS: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT-III

MARKETS: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

PRICING: Objectives, Methods of Pricing;

BUSINESS: Features of different forms of Business Organization (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

UNIT-IV

INTRODUCTION TO CAPITAL AND FINANCIAL ACCOUNTING: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

ACCOUNTING: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT-V

INVESTMENT DECISION: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

FINANCIAL ANALYSIS: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

TEXTBOOKS:

1. Varshney & Maheshwari, Managerial Economics, Sultan Chand,2009.
2. S.A. Siddiqui& A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, Hyderabad2013
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI, NewDelhi,2010.

REFERENCE BOOKS:

1. Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications,2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4. P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5. S. N. Maheshwari& S. K. Maheshwari, Financial Accounting, Vikas Publications.
6. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

COURSE OUTCOMES:

Students should be able

1. Gaining the analytical approach of firms demand and their significance in business decisions.
2. Acquiring the knowledge that, how the production is to be analyzed within the limits of cost for effective decision making.
3. Exposure about various market structures available to various businesses for smooth running of the firm.
4. A clear picture on how a firm is maintaining their business records using various accounting formats for effective running of the business.
5. Students are able to calculate various methods of capital budgeting and analyzing financial statements of the firm for effective decision making.

OPEN ELECTIVE – I

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE – II SEM **L/T/P/C**
3/-/-/3

OPEN ELECTIVE –I
(R20A1251) WEB DESIGNING TOOLS

COURSE OBJECTIVES:
Students should be able:

1. To understand the basics of web & html programming
2. To introduce CSS and its style
3. To brief on Java Scripting & Dynamic Html
4. To get acquainted with web server software AJAX
5. To peruse PHP and study the developing environments

UNIT –I:

Web Basics- Introduction, Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser, HTML-Introduction HTML-Basic Formatting Tags, HTML-Grouping Using Div Span, HTML-Lists, HTML-Images, HTML-Hyperlink, HTML-Table, HTML-I frame, HTML – Form HTML – Headers, HTML-Miscellaneous using tool Dreamweaver/ Visual studio

UNIT –II:

CSS –Introduction, Syntax, CSS-Selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS-Lists Tables, CSS -Box Model, CSS-Display Positioning, CSS Floats. Using tool using tool Dreamweaver/ Visual studio, Net Bean

UNIT-III:

Introduction of Java Script, JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script. XML Http Request- Introduction, XML Http Request, The XML Http Request Object, Events for the XML Http Request Object, Request Object for XML Http Request, Response Object for XML Http Request. Using tool using tool Visual studio, Net Bean & Eclipse

UNIT –IV:

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax, CSS to Define Look and Feel, Understand the XML Mark-up, XML Http Request. AJAX using XML and XML Http Request- Introduction, Ajax Using XML and XML Http Request, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML. Using tool using tool Visual studio, Net Bean & Eclipse

Unit V

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working of AJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query. Using tool using tool Visual studio, Net Bean & Eclipse

TEXT BOOKS:

1. Web Programming, Building Internet Applications, CHRIS BATES II Edition, Wiley Dreamtech.
2. Programming World Wide Web, SEBESTA, PEARSON.

REFERENCE BOOKS:

1. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson
2. Ajax: The Complete Reference By Thomas Powell
3. PHP: The Complete reference-steven Holzer Tata McGraw-Hill.
4. An Introduction to web Design and Programming –Wang-Thomson
5. Web Warrior Guide to Web Programming -Bai/Ekedaw-Thomas
6. Beginning Web Programming-Jon Duckett WROX

COURSE OUTCOMES:

Students will be able:

- To design a web application.
- To build creative style sheets using CSS
- To write java scripts for web application.
- To frame web template using Ajax
- To associate AJAX with PHP

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**

3/-/-/3

OPEN ELECTIVE – I
(R20A0551) INTRODUCTION TO DBMS

COURSE OBJECTIVES

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

UNIT I:

INTRODUCTION: Database -Purpose of Database Systems, File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II:

DATABASE DESIGN: ER Model - Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas.ER Diagram Notations- Goals of ER Diagram- Weak Entity Set-Views.

UNIT III:

STRUCTURED QUERY LANGUAGE: SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions- Null values. Views, Triggers.

UNIT IV:

DEPENDENCIES AND NORMAL FORMS: Importance of a good schema design- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FDs, - Minimal covers- Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties -

UNIT V:

TRANSACTIONS: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability, Serializability by Locks-Locking Systems with Several Lock Modes- Concurrency Control by

Timestamps, validation.

TEXT BOOKS:

1. Abraham Silber Schatz, Henry F. Korth, S. Sudarshan, ‖ Database System Concepts‖, McGraw- Hill, 6th Edition ,2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCE BOOKS:

1. Raghu Ramakrishnan, Johannes Gehrke, —Database Management System‖, McGraw Hill., 3rd Edition2007.
2. Elmasri & Navathe Fundamentals of Database System, ‖ Addison-Wesley Publishing,5th Edition,2008.
3. Date. C. J, —An Introduction to Database‖, Addison-Wesley Pub Co, 8th Edition,2006.
4. Peter robs, Carlos Coronel, —Database Systems – Design, Implementation, and Management‖, 9th Edition, Thomson Learning,2009.

COURSE OUTCOMES:

1. Understand the basic concepts and the applications of database systems
2. Master the basics of SQL and construct queries using SQL
3. Understand the relational database design principles
4. Familiarize with the basic issues of transaction processing and concurrency control
5. Familiarize with database storage structures and access techniques

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**

3/-/-/3

OPEN ELECTIVE – I
(R20A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1. To learn the basics, role, issues and agreement on trade aspects ofIPR
2. To know the Parties to IP Rights
3. To learn how to ensure the value ofIP
4. To learn about how to manage IPrights
5. To learn the remedies and IP Revaluation

UNIT-I

INTRODUCTION: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

UNIT-II

PARTIES TO IP RIGHTS: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

UNIT-III

ENSURING THE VALUE OF IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

UNIT-IV

MANAGING IP RIGHTS: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non-disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

UNIT-V

REMEDIES AND IPR EVALUATION: GATT - WTO - Role of WTO in solving IPR issues.

REFERENCE BOOKS:

1. A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
2. Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
3. Intellectual Property Rights: N K Acharya: ISBN:9381849309
4. Intellectual Property Rights: C B Raju: ISBN-8183870341
5. Intellectual Property: Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
6. Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0- 88132-282-2

COURSE OUTCOMES

1. Understand the basics, role, issues and agreement on trade aspects ofIPR
2. Understand and identifying the Parties to IP Rights
3. Learn how to ensure the value ofIP
4. Understand about how to manage IPrights
5. Learn the remedies and IP Revaluation

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– II SEM **L/T/P/C**

3/-/-/3

OPEN ELECTIVE – I
(R20A0051) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES

1. To know the basics of ERP
2. To understand the key implementation of ERP
3. To know the business modules of ERP
4. To learn about the post implementation of ERP
5. To evaluate the current and future trends in ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP) and Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill,2008
2. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi,2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India,2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill,2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2nd edition,2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA,2001.

COURSE OUTCOMES:

1. Understand the basics of ERP
2. Understand the key implementation of ERP
3. Learn the business modules of ERP
4. Learn about the post implementation of ERP
5. Evaluating the current and future trends in ERP

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE– IISEM **L/T/P/C**
3/-/-/3

OPEN ELECTIVE – I
(R20A0451) BASICS OF COMPUTER ORGANIZATION

COURSE OBJECTIVES:

1. To understand basic components and operations in a system
2. To understand the execution of an instruction in a computer.
3. To acquire the knowledge to design of CPU.
4. To explore the memory organization.
5. To explore I/O organization and parallel processing in depth.

UNIT I

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional Units, Computer Registers, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers. Data Representation: Fixed Point Representation, Floating – Point Representation.

REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS: RTL- Register transfers, Bus and Memory Transfers. Micro operations: Arithmetic, Logic, Shift micro-operations, Arithmetic logic shift unit.

UNIT-II

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms. Error detection and Correction Codes

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Timing and Control, Computer Instructions: Memory Reference Instructions, Register Transfer Instructions, Input– Output Instructions, Instruction cycle. Interrupt and Interrupt cycle, Complete Computer Description

UNIT III

CENTRAL PROCESSING UNIT ORGANIZATION: General Register Organization, Stack organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, CISC and RISC processors.

CONTROL UNIT DESIGN: Control Memory, Address sequencing, Design of CU: Micro Programmed Control, Hardware Control, Micro Program example. Case Study- Introduction to x86architecture.

UNIT IV

MEMORY ORGANIZATION: Memory Hierarchy, Memory Interleaving, Main Memory-RAM and ROM chips, Associative Memory-Hardware Organization, Match logic. Mapping

Functions- Associate, Direct, Set Associative Mapping. Cache Memory: Hit Ratio, Cache Coherence, Cache writes policies. Auxiliary memory: Magnetic Disks, Magnetic Tapes Optical devices, Page Replacement Algorithms.

UNIT V

INPUT – OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Subsystems, I/O Device Interface, I/O Processor, I/O Transfers–Program Controlled, Interrupt Driven, and DMA, Interrupts and Exceptions. I/O Device Interfaces – SCII, USB.

PIPELINING AND VECTOR PROCESSING: Basic Concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards. Vector Processing: Applications, an Example for Vector Processing.

TEXT BOOKS:

1. Computer System Architecture‖ by M. Morris Mano, 3rdEdition.
2. Computer Organization and Design: The Hardware/Software Interface‖, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
3. Computer Organization and Embedded Systems‖, 6th Edition by Carl Hamacher, Mc Graw Hill Higher Education.

REFERENCE BOOKS:

1. Computer Architecture and Organization‖, 3rd Edition by John P. Hayes, WCB /McGraw-Hill
2. Computer Organization and Architecture: Designing for Performance‖, 10th Edition by William Stallings, Pearson Education.
3. Computer System Design and Architecture‖, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

COURSE OUTCOMES:

1. Able to understand functional components and micro-operations in a computer.
2. Able to understand arithmetic operations and computer instructions.
3. Able to understand CPU organization and design of control unit.
4. Able to understand the Memory organization.
5. Able to understand I/O Transfer and Parallel Processing.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE – II SEM **L/T/P/C**

-/-/3/1.5

(R20A0283) CONTROL SYSTEMS AND SIMULATION LAB

COURSE OBJECTIVES:

1. To study the system performance using time domain analysis and methods for improving it.
2. To assess the system performance using frequency domain analysis and techniques for improving the performance to design various controllers and compensators to improve system performance.
3. To design various controllers and compensators to improve system performance.
4. To study the characteristics of servo mechanisms which are helpful in automatic control systems?
5. To understand the different ways of system representations such as transfer function representation and state space representations and to assess the system dynamic response.

PART-A

The following experiments are required to be conducted compulsory experiments:

1. Time response of Second order system
2. Characteristics of Synchro's
3. Effect of feedback on DC servomotor
4. Transfer function of DC motor
5. Transfer function of DC generator
6. Characteristics of AC servo motor
7. Temperature controller using PID
8. Effect of P, PD, PI, PID Controller on a second order systems

PART-B

In addition to the above eight experiments, at least any two of the experiments from the Following list are required to be conducted

9. Lag and lead compensation – Magnitude and phase plot.
10. Programmable logic controller- Study and verification of truth tables of logic gates, Simple Boolean expressions.
11. a) Simulation of P, PI, PID Controller.
    b) Linear system analysis (Time domain analysis, Error analysis) using suitable software
12. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using Suitable software
13. State space model for classical transfer function using suitable software – Verification.
14. Design of Lead-Lag compensator for the given system and with specification using Suitable software

COURSE OUTCOMES:

At the end of the course, students would be able to:

1. Determine the performance and time domain specifications of first order systems.
2. Analyze various time domain and frequency domain techniques to assess the system performance.
3. Study the system performance by selecting a suitable controller and/or a compensator for a specific application.
4. Get the knowledge about the effect of poles and zeros location on transient and steady state behavior of second order systems and can implement them to practical systems.
5. Study system controllability and observability using state space representation and applications of state space representation to various systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE – II SEM **L/T/P/C**

-/-/3/1.5

(R20A0284) ELECTRICAL MACHINES - I LAB

COURSE OBJECTIVES:

1. To expose the students to the operation of DC Generator to expose the students to the operation of DC Motor.
2. To examine the self-excitation in DC Generators.

PART-A

The following experiments are required to be conducted compulsory experiments:

1. Load test on DC shunt generator. Determination of characteristics.
2. Load test on DC series generator. Determination of characteristics.
3. Load test on DC compound generator. Determination of characteristics.
4. Determination of critical resistance and critical speed of D.C. shunt generator
5. Hopkinson's test on DC shunt machine. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Speed control of DC shunt motor
8. Brake test on DC compound motor. Determination of performance curves.

PART-B

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

9. Retardation test on DC shunt motor. Determination of losses at rated speed.
10. Separation of losses in DC shunt motor
11. Automated Characterization of DC shunt Generator
12. Automated Characterization of DC Series Generator

COURSE OUTCOMES:

After successfully studying this course, students will:

1. Be able to systematically obtain the equations that characterize the performance of
2. An electric circuit as well as solving both single phase and DC Machines.
3. Acknowledge the principles of operation and the main features of electric machines and their applications.
4. Acquire skills in using electrical measuring devices.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II YEAR B. Tech EEE – II SEM **L/T/P/C**
2/-/-/-

(R20A0004) FOREIGN LANGUAGE-FRENCH

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

COURSE OBJECTIVES

1. To inculcate the basic knowledge of the French language
2. To hone the basic sentence constructions in day-to-day expressions for communication in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELFA1
5. To develop in the student an interest towards learning languages.

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet – Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ' and “to have '' in the present tense of the indicative

Vocabulary: The numbers from 1 to 20 - Professions-Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The–erverbs in the present- Possessive adjectives - Qualifying adjectives

Vocabulary: The family – Clothes-Colors- The numbers from 1 to 100-Theclassroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar: The expression of time– The –ir verbs in the present- The verbs do, go, take, come, - Adverbs-Reflexive verbs

Vocabulary: The days and months of the year- The Sports-Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will andthe capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market Grammar: Verbs "towant", "tocan"- Express capacity/possibility-Express will/desire – the future tense

Vocabulary: The food – Meals-Fruits and vegetables– The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation -describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives- Prepositions- The verb 'must' to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays-The city– Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apperson's le Français 1& 2, New Saraswati House,2015
2. A propos, A1, Langers International,2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Course book) By Livid Language
5. Ã Adventure: An Introduction to French Language and Francophone Culturesby Evelyne Charvier-Berman, Anne C.Cummings.

COURSE OUTCOMES

1. The students will be able to communicate in French at A1level.
2. The student will have an advantage in the competitive job market.
3. This course benefits the graduates when pursuing study opportunities in the countries where French is the official language.
4. The students will obtain the basic knowledge of the French language
5. The students are able to perform DELFA1

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(R20A0208) POWER SYSTEM -II

Prerequisite: Power System –I

COURSE OBJECTIVES:

- To understand Concept of Underground cables.
- To examine D.C. distribution systems.
- To examine A.C distribution systems.
- To understand the Substation and Bus bar arrangements.
- To understand the compensation methods in power system

UNIT-I:

SAG AND TENSION CALCULATIONS: Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems.

UNDERGROUND CABLES: OH lines versus UG cables, Types of Cables, Construction of cables, Types of Insulating materials, Calculation of Insulation resistance and Calculation of die-electric strength of cables-. Capacitance of Single and 3-Core belted cables- Grading of Cables: Capacitance grading, Inter sheath grading - Numerical Problems on cables.

UNIT-II:

D.C. DISTRIBUTION: Classification of Distribution Systems. - Comparison of DC vs. AC and Under-Ground vs. Over- Head Distribution Systems. - Requirements and Design features of Distribution Systems. - Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at both the ends (equal/unequal Voltages) and Ring Main Distributor.

UNIT-III:

A.C. DISTRIBUTION: Introduction, Types of AC distribution Systems, Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT-IV:

SUBSTATIONS & BUS BAR: Classification of substations, Indoor & outdoor substations, Substations Equipment's. Bus bar arrangements: single bus bar, sectionalized single bus bar, double bus bar, main and transfer bus bar systems.

UNIT-V:

COMPENSATION IN POWER SYSTEMS: Introduction - Concepts of Load compensation – Load ability characteristics of overhead lines – Uncompensated transmission line – Symmetrical line – Radial line with asynchronous load – Compensation of lines.

TEXT BOOKS:

1. John J. Grainger & W.D. Stevenson: Power System Analysis – McGraw Hill International1994.
2. C.L. Wadhwa: Electrical Power Systems – New Age International Pub. Co. Third Edition,2001.

REFERENCE BOOKS:

1. D.P. Kothari and I.J. Nagrath, Modern Power System Analysis - Tata McGraw Hill Pub. Co., New Delhi, Fourth edition,2011

COURSE OUTCOMES:

- Analyze transmission line performance.
- Apply load compensation techniques to control reactive power
- Understand the application of per unit quantities.
- Design over voltage protection and insulation coordination
- Determine the fault currents for symmetrical and unbalanced faults

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C 3/-/-/3**

(R20A0211) POWER ELECTRONICS

COURSE OBJECTIVES:

- To get an understanding of Semiconductor devices and systems which have a large application in the power generation, transmission, distribution and utilization.
- To get an in depth understanding of the basic concepts of different types of power Semi-conductor devices and their applications in converters, inverters, choppers, cyclo converter, dual converters, etc.

UNIT - I

POWER SEMI CONDUCTOR DEVICES & COMMUTATION CIRCUITS: Thyristors – Silicon Controlled Rectifiers (SCR's) - Two transistor analogy - Static and Dynamic characteristics - Turn on and turn off methods – Snubber circuit details – Line Commutation and Forced Commutation circuits – Power MOSFET, Power IGBT, their characteristics.

UNIT - II

AC - DC CONVERTERS (1-PHASE & 3-PHASE CONTROLLED RECTIFIERS): Phase control technique – Single phase Line commutated converters –Bridge connections – Half controlled converters with R, RL loads – Derivation of average load voltage and current – Numerical problems. Fully controlled converters, Bridge connections with R, RL loads – Derivation of average load voltage and current. Three phase converters – Three pulse and six pulse converters – Bridge connections average load voltage with R and RL loads – Effect of Source inductance for Single phase-controlled rectifiers – Single phase Dual converters.

UNIT - III

DC - DC CONVERTERS (CHOPPERS):

Choppers – Time ratio control and Current limit control strategies – Step down choppers Derivation of load voltage and currents with R, RL loads- Step up Chopper – load voltage expression.

UNIT - IV

AC - AC CONVERTERS (Qualitative Treatment Only)

AC VOLTAGE CONTROLLERS: Single phase AC voltage controllers with R and RL loads – Derivation of average load voltage and current, wave forms.

CYCLO CONVERTERS: Single phase cycloconverters - Types in bridge configuration with R and RL loads.

UNIT - V

DC - AC CONVERTERS (Qualitative Treatment Only):

INVERTERS: Basics of Inverters – Single phase inverter – Basic series inverter - operation and waveforms - Three phase inverters (120, 180 degrees conduction modes of operation) - Voltage control techniques for inverters, Pulse width modulationtechniques.

TEXT BOOKS:

1. Power Electronics, Dr. P. S. Bimbhra, Khanna Publishers
2. Power Electronics, M. D. Singh & K. B. Kanchan Hani, Tata Mc Graw - Hill Publishing Company.

REFERENCE BOOKS:

1. Power Electronics; Circuits, Devices and Applications, M. H. Rashid, Prentice Hall of India.
2. Power Electronics, Vedam Subramanyam, New Age International (P) Limited, Publishers.
3. Elements of Power Electronics, Philip T. Krein, Oxford University Press.
4. Power Electronics, P. C. Sen, Tata Mc Graw-Hill Publishing.

COURSE OUTCOMES:

At the end of the course the students get:

- A thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power Semiconductor devices, thyristors nature of the R and RL loads for different power inputs.
- AC-to-DC power conversion through 1-phase & 3-phase controlled rectifiers, DC-to-DC power conversion through step-up and step-down choppers.
- Different types of PWM (pulse-width modulation) techniques, steady-state and transient state analysis of all the power converters, which can be to applied to concepts of real- world electrical and electronics problems & applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(R20A0212) SWITCH GEAR AND PROTECTION

Prerequisite: Power Systems I & II, Electrical Machines I & II

COURSE OBJECTIVES:

1. To introduce all kinds of circuit breakers and relays for protection of Generators, Transformers and feeder bus bars from over voltages and other hazards.
2. To describe need and essential qualities of overall protection and principles of contactors
3. To understand the phenomenon of over voltages and its classification.
4. To give a brief idea about all types of circuit breakers and their operation.
5. To give a brief idea about all types of relays and their operation.

UNIT - I:

INTRODUCTION: Introduction, Need for power system protection, effects of faults, zones of protection, primary and backup protection, essential qualities of protection, classification of protective relays and schemes, basic relay terminology, Operating principles of contactors.

OVER VOLTAGE PHENOMENON: Overview on Generation of Over Voltages in Power Systems - Protection against Lightning Over Voltages - Valve type and Zinc Oxide Lighting Arresters

UNIT –II:

CIRCUIT BREAKERS: Elementary principles of arc interruption, Restriking Voltage and Recovery voltages. - Restriking Phenomenon, Average and Max. RRRV, Current chopping and Resistance Switching - Types Auto reclosures, Construction and Operation of following circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers.

UNIT - III:

ELECTROMAGNETIC RELAYS: Electromagnetic Attraction type Relays: Principle of Operation and construction of attracted armature, solenoid type, Balanced Beam, Electromagnetic Induction type Relays: Shaded pole relay, Watt-hour meter type relay, Cup type relay, Over current Relay - Instantaneous, DMT and IDMT relays, Distance relays: Impedance, Reactance and Mho relays and Static Relay.

UNIT-IV:

ALTERNATOR & TRANSFORMER PROTECTION: Differential Protection of Alternators, Modified Differential Protection for Alternators, Balanced or Restricted Earth-fault Protection, Stator Inter-turn Protection.

PROTECTION OF TRANSFORMERS: Percentage Differential Protection, Buchholtz relay Protection.

UNIT-V:

FEEDER AND BUS-BAR PROTECTION: Protection of Lines: Differential Pilot-Wire Protection- Merz-Price voltage balance system, Translay scheme, Carrier current protection, Protection of Bus bars: differential protection, Frame-earth Protection

TEXT BOOKS:

1. Badriram and D.N. Vishwakarma, Power System Protection and Switch gear, TMH2001.
2. U.A. Bakshi, M.V. Bakshi: Switchgear and Protection, Technical Publications, 2009.

REFERENCE BOOKS:

1. C. Russel Mason – "The art and science of protective relaying, Wiley Eastern,1995
2. L.P. Singh "Protective relaying from Electromechanical to Microprocessors", New Age International

COURSE OUTCOMES:

At the end of the course the student will be able to:

1. Apply technology to protect power system components.
2. Select relay settings of over current and distance relays.
3. Analyze quenching mechanisms used in air, oil and vacuum circuit breakers
4. Select an appropriate circuit breaker and relay unit in power system
5. Have a detailed understanding of over voltage phenomenon

PROFESSIONAL ELECTIVE - I

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-I)
(R20A0213) INDUSTRIAL AND ALLIED ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To give a basic knowledge on residential, commercial and wiring systems.
- To understand the different applications like heating, welding and illumination.
- To gives a comprehensive idea on UPS, Electric Traction and industrial electrical systems.

UNIT - I

ILLUMINATION: Introduction, terms used in illumination, laws of illumination, polar curves, photometry. Sources of light Discharge lamps: Mercury Vapor and Sodium Vapor lamps – comparison between tungsten filament lamps and fluorescent lamps. Basic principles of light control, Types and design of lighting and flood lighting.

UNIT - II

RESIDENTIAL AND COMMERCIAL ELECTRICAL SYSTEMS: Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthing for commercial installations. Selection and sizing of components.

UNIT - III

ELECTRIC HEATING AND WELDING: Electric Heating: Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating. Electric welding: resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT - IV

INDUSTRIAL ELECTRICAL SYSTEMS: Industrial loads, motors, starting of motors, Lightning Protection, methods of earthing, UPS System, Electrical Systems for the elevators, Battery banks, Selection of UPS and Battery Banks.

UNIT - V

ELECTRIC TRACTION: Traction Systems: types, overview of existing electric traction systems in India. Special features of traction motor. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves. Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. J.B. Gupta, “Utilization of Electric Power and Electric Traction”, Kataria & Sons publishers, Delhi, IX Edition, 2004.
2. C.L. Wadhwa, “Generation, Distribution and Utilization of electrical Energy”, New Age International (P) Limited Publishers, 3rd Edition, 2010
3. S. L. Uppal and G. C. Garg,” Electrical wiring Estimating & costing” Khanna publishers,2008
4. Utilization of electric Energy by E. Openshaw Taylor, Orient Longman Private Limited,1971.

REFERENCE BOOKS:

1. N.V. Suryanarayana, “Utilization of Electrical Power including Electric drives and Electric traction”, New Age International (P) Limited Publishers, 1st Edition, 1994.
2. E. Open Shaw Taylor, “Utilization of Electric Energy”, Orient Longman,1st Edition,1937

COURSE OUTCOMES:

After completion of the course, the student will be able to

- Maintain/Troubleshoot various lamps and fittings in use.
- Understand various types of Heating, Welding and traction system.
- Design Illumination systems for various applications.
- Work in the areas of UPS systems and traction systems production, commissioning and maintenance.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-I)
(R20A0214) ELECTRICAL MACHINE DESIGN

COURSE OBJECTIVES:

- To understand basic design aspects of static and rotating electrical machines.
- To understand the design concepts, pertaining to dimensions, materials, winding configurations, cooling systems etc.
- To understand and appreciate the major design aspects pertaining to temperature ratings efficiency etc.

UNIT – I:
INTRODUCTION TO ELECTRICAL MACHINE DESIGN: Design concepts, factors, Material selection, manufacturing techniques, Review of basic principles, Heating, cooling techniques

UNIT – II:
CONSTRUCTIONAL DETAILS OF MACHINES (DC & AC): Constructional details – output equation – Choice of specific electric and magnetic loadings – Separation of D and L for rotating machines. Estimation of number of conductors / turns – coils – armature Slots – Conductor dimension, Slot dimension, Choice of number of poles – Length of air gap – Design of field system, Interpoles, Commutator and Brushes.

UNIT – III
TRANSFORMERS: Construction –Core and Yoke Design – cross section, cooling of transformers, Number of tubes, Transformer windings, Coil design, output equation, determination of number of turns and length of mean turn of winding, Resistance, Leakage reactance no load current calculation, losses and efficiency.

UNIT – VI
INDUCTION MOTORS: Choice of specific electric and magnetic loadings, Stator design (Frames), output equation, choice of conductor rating, stator winding, and stator slots. Squirrel cage rotor design – air gap length, rotor slots and rotor bars. Design of wound rotor – rotor slots, windings, short circuit (blocked rotor currents)

UNIT – V
SYNCHRONOUS MACHINES: Constructional features – short circuit ratio – output equation – specific loadings – main dimensions – Stator design – design of Salient pole field coil.

TEXT BOOKS:

1. "Electrical machine design" – A.K Sawhney, Dhan path Rao

REFERENCE BOOKS:

1. Performance and Design of DC machines, Clayton & Hancock, ELBS
2. Performance and Design of AC machines, M.G. Say, Pitman, ELBS

COURSE OUTCOMES:

Upon completing the course students will be able to:

- Understand the design aspects of various parts of DC machines and solve the problems of design
- Student should be able to understand the design concepts of transformers and know about how to design the parts.
- Student is able to understand the design concepts of synchronous machines and solve the problems related to design.
- Student understands the importance of design of machines based on their applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-I)
(R20A0215) POWER PLANT ENGINEERING

COURSE OBJECTIVES:

- To study operation and maintenance of Power Stations.
- Able to learn about different power plants.
- To study about Non-Conventional Power Generation.

UNIT-I:

INTRODUCTION: Energy resources and their availability, types of power plants, selection of the plants, review of basic thermodynamic cycles used in power plants. Hydro Electric Power Plants: Rainfall and run-off measurements and plotting of various curves for estimating stream flow and size of reservoir, power plants design, construction and operation of different components of hydro-electric power plants, site selection, comparison with other types of power plants.

UNIT-II:

STEAM POWER PLANTS: Flow sheet and working of modern-thermal power plants, super critical pressure steam stations, site selection, coal storage, preparation, coal handling systems, feeding and burning of pulverized fuel, ash handling systems, dust collection-mechanical dust collector and electrostatic precipitator.

COMBINED CYCLES: Constant pressure gas turbine power plants, Arrangements of combined plants (steam & gas turbine power plants), re-powering systems with gas production from coal, using PFBC systems, with organic fluids, parameters affecting thermodynamic efficiency of combined cycles.

UNIT-III:

NUCLEAR POWER PLANTS: Principles of nuclear energy, basic nuclear reactions, nuclear reactors-PWR, BWR, CANDU, Sodium graphite, fast breeder, homogeneous; gas cooled. Advantages and limitations, nuclear power station, waste disposal. Power Plant Economics: load curve, different terms and definitions, cost of electrical energy, tariffs methods of electrical energy, performance & operating characteristics of power plants- incremental rate theory, input-output curves, efficiency, heat rate, economic load sharing.

UNIT-IV:

NON-CONVENTIONAL POWER GENERATION: Solar radiation estimation, solar energy collectors, low, medium & high temperature power plants, OTEC, wind power plants, tidal power plants, geothermal power plants.

UNIT-V:

DIRECT ENERGY CONVERSION SYSTEMS: Fuel cell, MHD power generation-principle, open & closed cycle's systems, thermoelectric power generation, thermionic power generation.

TEXTBOOKS:

1. Power station Engineering and Economy by Bernhardt G.A. skrotzki and William A. Vopat – Tata McGraw Hill Publishing Company Ltd., New Delhi
2. Power Plant Engineering: P.K. Nag Tata McGraw Hill second Edition 2001.
3. A Course in Power Plant Engineering: / Arora and S. Domkundwar/ Dhan pat Rai Publisher
4. Power Plant Engineering / P.C. Sharma / S.K. Kataria Publisher
5. A Text Book of Power Plant Engineering / R.K. Rajput / Laxmi Publications

REFERENCE BOOKS:

1. Power Plant Engineering/ P.K. Nag II Edition /TMH Publishers
2. An Introduction to Power Plant Technology / G.D. Rai/Khanna Publishers
3. Power plant Engg /Elanchezhian/I.K. International Publishers

COURSE OUTCOMES:

At the end of the course the students will be able

- To Study various *non-conventional sources* in remote areas of the country.
- Students get the exposure of different power plants.
- To analyze the thermionic power generation.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(PROFESSINAL ELECTIVE-I)
(R20A0510) COMPUTER NETWORKS

COURSE OBJECTIVES:

- To introduce the fundamental types of computer networks.
- To demonstrate the TCP/IP & OSI model merits & demerits.
- To know the role of various protocols in Networking.

UNIT - I

INTRODUCTION: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet. Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II

DATA LINK LAYER: Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols

MULTIPLE ACCESS PROTOCOLS - ALOHA, CSMA, CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, Data link layer switching: Use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III

NETWORK LAYER: Network Layer Design issues, store and forward packet switching connection less and connection-oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms,

IP addresses, CIDR, Sub netting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV

TRANSPORT LAYER: Services provided to the upper layers elements of transport protocol-addressing connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.

The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

UNIT - V

APPLICATION LAYER: Introduction, providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET, DNS; RSA algorithm,

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W.Ross, 3rd Edition, Pearson Education.

COURSE OUTCOMES:

- To understand and explore the basics of Computer Networks and Various Protocols.Student will be in a position to understand the World Wide Web concepts.
- Able to administrate a network and flow of information further Student can understand easilythe concepts of network security, Mobile, and ad hoc networks.

PROFESSIONAL ELECTIVE -II

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-II)
(R20A0216) HIGH VOLTAGE ENGINEERING

COURSE OBJECTIVES:

To understand:

- The detailed analysis of Breakdown in gaseous, liquids and solid dielectrics.
- Information about generation and measurement of High voltage and current.
- High voltage testing methods.

UNIT – I

INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS: Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, rotating machines, circuit breakers, cable power capacitors and bushings.

UNIT – II

BREAK DOWN IN GASEOUS, LIQUID DIELECTRICS AND SOLID DIELECTRICS: Gases as insulating media, collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, pure and commercial liquids, breakdown in pure and commercial liquids. Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, solid dielectrics used in practice.

UNIT – III

GENERATION OF HIGH VOLTAGES AND CURRENTS: Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS: Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT – IV

OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION: Natural causes for over voltages – Lightning phenomenon, Overvoltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

UNIT – V

NON-DISTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS: Measurement of D.C Resistivity, Measurement of Dielectric Constant and loss factor, Partial discharge measurements. **HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS:** Testing of Insulators and bushings, testingof Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters and Radio Interference measurements.

TEXT BOOKS:

1. M. S. Naidu, V. Kamaraju (2009), High Voltage Engineering, 4th edition, Tata McGraw Hill Publications, New Delhi.
2. E. Kuffel, W. S. Zaengl, J. Kuffel (2000), High Voltage Engineering: Fundamentals, 2nd edition, Elsevier Publishers, New York, USA.

REFERENCE BOOKS:

1. C. L. Wadhwa (2007), High Voltage Engineering, New Age Internationals (P) Limited, New Delhi.
2. Ravindra Arora Wolfgang Mosch (2011), High Voltage Insulation Engineering, 1st edition,New Age International (P) Ltd., New Delhi.

COURSE OUTCOMES:

After completing this course, the student must demonstrate the knowledge and ability to:

- Explain the techniques for high voltage generation
- Measure high voltage in power systems and describe the electrostatic fields and its control, design insulators for high voltage applications,
- Capable to perform non-destructive insulation test techniques
- Describe the over-voltages, testing procedures and insulation coordination, learn how to design and do testing of external insulation

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-II)
(R20A0217) ELECTRICAL ESTIMATION AND COSTING

COURSE OBJECTIVES:

- Emphasize the estimating and costing aspects of all electrical equipment, installation anddesigns to analyze the cost viability.
- Exposure to design and estimation of wiring, design of overhead and underground distributionlines, substations and illuminations design.
- These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage.

UNIT-I:

DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of Electrical Installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections, Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution Board, guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT-II:

ELECTRICAL INSTALLATION OF BUILDINGS AND SMALL INDUSTRIES: Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT-III:

OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports for Transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT-IV:

SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substation, Floor mounted type.

UNIT-V:

DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in Illumination, laws of illumination,various types of light sources, Practical lighting schemes

TEXT BOOKS:

1. Electrical Design Estimating and Costing, K.B. Raina, S.K. Bhattacharya, New Age InternationalPublisher.
2. Design of Electrical Installations, Dr. V.K. Jain, Dr. Amitabh Bajaj, University Science Press.
3. Electricity pricing Engineering Principles and Methodologies, Lawrence J. Vogt, P.E., CRC Press.

REFERENCE BOOKS:

1. Guide for Electrical Layout in residential buildings, Indian Standard Institution, IS:4648-1968
2. Electrical Installation buildings Indian Standard Institution, IS: 2032.

COURSE OUTCOMES:

After going through this course, the student gets knowledge on:

- The estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
- Exposure to design and estimation of wiring, design of overhead and underground distribution lines, substations and illuminations design.
- These techniques should help the students to successfully estimate costing of the products/projects that are part of our everyday usage and apply the above concepts to real- world electrical and electronics problems and applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-II)
(R20A0218) ENERGY STORAGE SYSTEMS

COURSE OBJECTIVES:

The objectives of this course is to acquire knowledge on

- Need of energy storage and different types of energy storage.
- Thermal, magnetic, electrical and electrochemical energy storage systems.
- Emerging needs for EES pertaining to Renewable energy
- Types of electrical energy storage systems
- Sign and Applications of Electrical Energy Storage

UNIT - I:

Introduction:

Necessity of energy storage, different types of energy storage, mechanical, chemical, electrical, electrochemical, biological, magnetic, electromagnetic, thermal, comparison of energy storage technologies

UNIT - II:

Energy Storage Systems:

Thermal Energy storage-sensible and latent heat, phase change materials, Energy and exergy analysis of thermal energy storage, Electrical Energy storage-super-capacitors, Magnetic Energy storage-Superconducting systems, Mechanical-Pumped hydro, flywheels and pressurized air energy storage, Chemical-Hydrogen production and storage, Principle of direct energy conversion using fuel cells, thermodynamics of fuel cells, Types of fuel cells, Fuel cell performance, Electrochemical Energy Storage-Battery, primary, secondary and flow batteries.

UNIT - III

Needs for Electrical Energy Storage:

Emerging needs for EES, more renewable energy-less fossil fuel, Smart Grid uses - the roles of electrical energy storage technologies-the roles from the viewpoint of a utility-the roles from the viewpoint of consumers-the roles from the viewpoint of generators of renewable energy.

UNIT - IV:

Types of Electrical Energy Storage systems:

Electrical storage systems, Double-layer capacitors (DLC), Superconducting magnetic energy storage (SMES), super charging stations, Thermal storage systems, Standards for EES, Technical comparison of EES technologies.

UNIT - V:

Design and Applications of Electrical Energy Storage:

Renewable energy storage-Battery sizing and stand-alone applications, stationary (Power Grid application), Small scale application-Portable storage systems and medical devices, Mobile storage Applications- Electric vehicles (EVs), types of EVs, batteries and fuel cells, future technologies, hybrid systems for energy storage.

Text Books:

- Energy Storage - Technologies and Applications by Ahmed Faheem Zobaa, InTech.
- Fundamentals of Energy Storage by J. Jensen and B. Sorenson, Wiley-Interscalene, NewYork,
- Energy Storage: Fundamentals, Materials and Applications, by Huggins R. A., Springer.

Reference Books:

- Thermal energy storage: Systems and Applications by Dincer I. and Rosen M. A., Wileypub.
- Energy Storage: Fundamentals, Materials and Applications, by Huggins R. A., Springer.
- Electric & Hybrid Vehicles by G. Pistoia, Elsevier B. V.
- Fuel cell Fundamentals by R. O' Hayre, S. Cha, W. Colella and F. B. Prinz, Wiley Pub.

Course Outcomes:

The students should be able to

- know the characteristics of electricity and need for continuous and flexible supply
- discuss about the role of electrical energy storage technologies
- analyses feature of EES systems
- acquire knowledge on various types of EES systems
- apply EES systems to various applications such as smart micro grid, smart home etc.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-II)
(R20A0403) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:
The main objectives of the course are:

1) To understand the basic concepts of basic elementary signals and Fourier Series representation.
2) To Master the representation of signals in the frequency domain using Fourier transforms and Discrete Fourier transform
3) To learn the Mathematical and computational skills needed to understand the principal of Linear System and digital signal processing fundamentals.
4) To understand the implementation of the DFT in terms of the FFT.
5) To learn the Realization of Digital Filters

UNIT I:
INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT)signals, Classification of Signals, Basic Operations on signals.
FOURIER SERIES: Exponential Fourier series, Dirichlet's conditions, Complex Fourier Spectrum.

UNIT II:
FOURIER TRANSFORMS: Fourier transform of arbitrary signal; Fourier transform of standard signals. DISCRETE FOURIER TRANSFORMS: Computation of DFT, Linear Convolution of Sequences using DFT, Over-lap Add Method, Over-lap Save Method.

UNIT III:
FAST FOURIER TRANSFORMS: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT.

UNIT IV:
INTRODUCTION TO LINEAR SYSTEMS: Introduction to Systems, Classification of Systems. INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction to Digital Signal Processing, Linear Shift Invariant Systems, Stability, and Causality of Discrete time systems

UNIT V:
Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Region of convergence in Z-Transform.
REALIZATION OF DIGITAL FILTERS: Realization of Digital Filters – Direct and Canonic form.

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.
3. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
4. Digital Signal Processing A. Anand Kumar, PHI Publications.

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
3. Digital Signal Processing – S. Saliva Hanan, A. Vallavaraj and C. Gnana Priya, TMH,2009.
4. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI,2009.

COURSE OUTCOMES:

After completion of the course, the student would be able to:

1) Understand the basic elementary signals.
2) Represent signals in the frequency domain using Fourier Series, Discrete Fourier series, Fourier transform and Discrete Fourier transform techniques.
3) Understand the principle of Linear System and digital signal processing fundamentals.
4) Implement DFT of any signal using FFT algorithm.
5) Realize Digital Filters

OPEN ELECTIVE – II

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-I Sem **L/T/P/C**
3/-/-/3

OPEN ELECTIVE - II
(R20A1252) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

1) To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
2) To learn how to plan for information systems &implementation
3) To study about security aspects of information systems

UNIT-I:

Introduction: MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

UNIT-II:

Business Applications of Information Systems: E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

UNIT-III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

UNIT-IV:

Building of Information Systems: System Development Stages, System Development Approaches. Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination. Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

UNIT-V:

Introduction to Cyber Crime: Cyber Crime Definition and orgin of the word, cyber-crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber-crimes and Indian ITA 2000, Global perspective on cybercrime-Cybercrime era. (Refer: Nina Godbole et al)

TEXT BOOK

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCES:

1. Nina Godbole & Sunit Belapure "Cyber Security" Wiley India 2012.
2. Javadekar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
4. A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
5. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP – https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) – https://magento.com/
8. Adempiere – ERP: http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS – http://www.lumina.com
10. Open Rules – Business Rules and Decision Management system –http://openrules.com/

COURSE OUTCOMES:

1) Ability to apply Concepts & applications of Management Information Systems.
2) Ability to perform Information Systems Planning & Implementations.
3) Ability to adapt Cyber-crime and information security procedures.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-I Sem **L/T/P/C**
3/-/-/3

OPEN ELECTIVE - II
(R20A0552) JAVA PROGRAMMING

COURSE OBJECTIVES:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

1) To create Java programs that leverage the object-oriented features of the Java language,such as encapsulation, inheritance and polymorphism;
2) Use data types, arrays and strings;
3) Implement error-handling techniques using exception handling,
4) Create and event-driven GUI using AWT components.

UNIT I

OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object-oriented programming paradigms.

Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, Buffered Reader class, Scanner class, String Tokenizer class, inner class.

UNIT II

Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods. Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III

Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

Multi-threading: Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events, Adapter classes. Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V

GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics. AWT controls - Labels, button, text field, check box, and graphics. Layout Manager – Layout manager types: border, grid and flow. Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.
3. Core Java an integrated approach, dreamtech publication, Dr. R. Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J. Deitel and H.M. Deitel, PEA (or) Java: How to Program, P.J. Deitel and H.M. Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

COURSE OUTCOMES:

1) An understanding of the principles and practice of object-oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high-level language;
3) An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
4) Be able to make use of members of classes found in the Java API.
5) Demonstrate the ability to employ various types of constructs and a hierarchy of Java classes to provide solution to a given set of requirements.
6) Able to develop applications using Applet, awt and GUI Programming.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-I Sem **L/T/P/C**
3/-/-/3

OPEN ELECTIVE - II
(R20A1253) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

The Main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience - based creation & improvement of models (process management).

The Objectives of the course can be characterized as follows:

1) Understanding the specific roles within a software organization as related to project and processmanagement
2) Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3) Understanding the basic steps of project planning, project management, quality assurance, andprocess management and their relationships

UNIT-I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases.

UNIT-III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-IV

Flows of the Process: Software Process Workflows, Iteration workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cocomo Cost Estimation model.

UNIT-V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, -Software Project Management||, 1998, PEA.
2. Henry, -Software Project Management||, Pearson.

REFERENCE BOOKS:

1. Richard H. Thayer. || Software Engineering Project Management||, 1997, IEEE ComputerSociety.
2. Shere K.D.: -Software Engineering and Management||, 1998, PHI.
3. S.A. Kelkar, -Software Project Management: A Concise Study, PHI.
4. Hughes Cotterel, -Software Project Management||, 2e, TMH. 88 5. Kaeron Conway, Software Project Management from Concept to D

COURSE OUTCOMES:

At the end of the course, the student shall be able to:

1) Describe and determine the purpose and importance of project management from theperspectives of planning, tracking and completion of project
2) Compare and differentiate organization structures and project structures.
3) Implement a project to manage project schedule, expenses and resource with the application ofsuitable project management tools

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-I Sem **L/T/P/C**
3/-/-/3

OPEN ELECTIVE - II
(R20A0452) INTERNET OF THINGS AND ITS APPLICATIONS

COURSE OBJECTIVES:

1) To study IoT Networking Core
2) To study IoT related network fundamentals
3) To study IoT Architecture.
4) To study IoT Application Development procedure
5) To study various case studies and IoT applications.

UNIT I

The IoT Networking Core:

Technologies involved in IoT Development: Internet/Web and Networking Basics OSI Model,Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing IoT Platform overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

UNIT II

Network Fundamentals: Overview and working principle of Wired Networking equipment's – Router, Switches, Overview and working principle of Wireless Networking equipment's– Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware &Device Files interactions.

UNIT III

IoT Architecture: History of IoT, M2M–Machine to Machine, Web of Things, IoT protocols Applications: Remote Monitoring & Sensing, Remote Controlling, and Performance Analysis. The Architecture Layering concepts, IoT Communication Pattern, IoT protocol Architecture, The 6LoW PAN Security aspects in IoT

UNIT IV

IoT Application Development: Application Protocols MQTT, REST/HTTP, CoAP, MySQL. Back-end Application Designing Apache for handling HTTP Requests, PHP & My SQL for data processing, Mongo DB Object type Database, HTML, CSS & jQuery for UI Designing, JS ON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android/IOS App Development tools

UNIT V

Case Study & IoT Applications: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment's. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi/ Intel Galileo/ARM Cortex/ Arduino)

TEXT BOOKS:

1. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley
2. Internet of Things: Converging Technologies for Smart Environments and Integrated Eco systems, Dr. Ovidiu Vermes an, Dr. Peter Friess, River Publishers
3. Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

REFERENCES:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huan sheng Ning
2. Internet of Things (A Hands-on-Approach), Vijay Madisetti, Arshdeep Bahga
3. Designing the Internet of Things, Adrian McEwen (Author), Hakim Cassimally
4. Asoke K Talukder and Roopa R Yavagal, "Mobile Computing," Tata Mc Graw Hill,2010.
5. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014
6. Computer Networks; By: Tanenbaum, AndrewS; Pearson Education Pte. Ltd., Delhi, 4thEdition
7. Data and Computer Communications; By: Stallings, William; Pearson Education Pte. Ltd., Delhi, 6thEdition

COURSEOUTCOMES:

At the end of the course, the student will be able to

1) Understand IoT Networking Core
2) Understand IoT related network fundamentals
3) Understand IoT Architecture.
4) Understand IoT Application Development procedure
5) Understand various case studies and IoT applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-I Sem **L/T/P/C**
3/-/-/3

OPEN ELECTIVE - II
(R20A0553) OPERATING SYSTEM CONCEPTS

COURSE OBJECTIVES:

1) To understand the basic concepts and functions of operating systems.
2) To understand Processes and Threads
3) To understand the concept of Deadlocks.
4) To analyze various memory management schemes.
5) To understand I/O management and File system

UNIT-I

Introduction: Concept of Operating Systems, OS Services, Structure of an Operating Systems
Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching
Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.

UNIT-II

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non-pre-emptive, FCFS, SJF, RR
Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion. Classical IPC Problems: Reader 's & Writer Problem, Dinning Philosopher Problem, The Producer/Consumer Problem, Semaphores, Monitors.

UNIT-III

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and Externalfragmentation;
Paging: Principle of operation – Page allocation – Hardware support for paging, protection and sharing, Disadvantages of paging.
Virtual Memory: Basics of Virtual Memory, Page fault, Demand paging;
Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV

File Management: Concept of File, Access methods, File types, File operation, File System structure, Allocation methods (contiguous, linked, indexed), Directory structure, directory implementation (linear list, hash table), efficiency and performance.

UNIT-V

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker 's algorithm, Deadlock detection and Recovery.
Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Diskreliability, Disk formatting, Boot-block, Bad blocks.

TEXT BOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, GregGagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, PrenticeHall of India.

REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, IrwinPublishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice- Hallof India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly andAssociates

COURSE OUTCOMES:

At the end of the course the students are able to:

1) Create processes and threads.
2) Implement algorithms for process scheduling for a given specification of CPU utilization,Throughput, Turnaround Time, Waiting Time, Response Time.
3) Develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4) Design and implement file management system.
5) Analyze various disk scheduling schemes

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-I Sem **L/T/P/C**
3/-/-/3

OPEN ELECTIVE - II
(R20A0066) PUBLIC POLICY & GOVERNANCE

Course objectives:

- To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
- To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
- To make understand the process and various approaches in public policy making
- To understand the theories and issues of social coordination and the nature of all patterns of rule.
- To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. **Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

Text and Reference books:

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

Course outcomes

After completion of the course, student will be able to

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making
4. Understands various concepts, and techniques of governance and its policy-making decisions

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
-/-/3/1.5

(R20A0285) ELECTRICAL MACHINES LAB -II

COURSE OBJECTIVES:

- To understand the operation of synchronous machines.
- To understand the analysis of power angle curve of a synchronous machine**.**
- To understand the equivalent circuit of a single-phase transformer and single-phase induction motor.
- To understand the circle diagram of an induction motor by conducting a blocked rotor test.

PART-A

The following experiments are required to be conducted as compulsory experiments

1. Sumpner's test on a pair of single-phase transformers
2. No-load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance method
4. Regulation of a three –phase alternator by MMF method
5. V and Inverted V curves of a three—phase synchronous motor.
6. Equivalent Circuit of a single-phase induction motor
7. Determination of Xd and Xq of a salient pole synchronous machine
8. Load test on three phase Induction Motor

PART-B

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list

9. Regulation of three-phase alternator by Z.P.F.
10. Measurement of sequence impedance of a three-phase alternator.
11. Scott Connection of transformer
12. Efficiency of 3 phase alternator.

COURSE OUTCOMES:

After the completion of this laboratory course, the student will be able to

- Understand the performance of different machines using different testing methods to convert from three phase to two phase and vice versa.
- Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods.
- Control the active and reactive power flows in synchronous machines Start different machines and control the speed and power factor.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
-/-/3/1.5

(R20A0286) ELECTRICAL MEASUREMENTS LAB

COURSE OBJECTIVES:

- To calibrate LPF Watt Meter, energy meter, P.F Meter using electro dynamo meter type instrument as the standard instrument.
- To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges &A.C Bridges.
- To determine three phase active & reactive powers using single wattmeter method practically.
- To determine the ratio and phase angle errors of current transformer and potential transformer.

Among the following experiments any 10 are to be conducted:

1. Calibration and Testing of single-phase energy Meter
2. Measurement of tolerance of batch of low resistances by Kelvin's double bridge
3. Measurement of voltage, current and resistance using dc potentiometer
4. Schering Bridge and Anderson bridge.
5. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
6. Calibration of LPF wattmeter by Phantom testing
7. Calibration of dynamometer type power factor meter.
8. Measurement of reactive power using single wattmeter in three-phase circuit.
9. Measurement of Displacement with the help LVDT
10. Measurement of different ranges of temperatures using i) RTD ii) Thermo couple
11. Measurement of voltage, frequency &phase with the help of CRO
12. Measurement of load with the help of strain gauges
13. Measurement of % ratio error and phase angle of given C.T. by Silsbee's method.
14. Dielectric testing of transformer oil
15. Measurement of Iron loss in a bar specimen using Epstein square

COURSE OUTCOMES:

After completion of this course the student is able to:

- Get the ability to choose instruments and can test any instrument can find the accuracy of any instrument by performing experiment can calibrate PMMC instrument using D.C potentiometer.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – I SEM **L/T/P/C**
2/-/-/-

(MANDATORY COURSE)
(R20A0007) INDIAN CONSTITUTION

INTRODUCTION

The Indian judiciary and particularly the Supreme Court of India have played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest courts in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

COURSE OBJECTIVES:

- To enable the students to understand the constitution's origin and its power.
- To enable the students to analyze the political principles.
- To enable the students to be aware of their fundamental rights and duties.

The following course content is prescribed for this course.

UNIT –I (4hrs)

Meaning of constitution law and constitutionalism, Historical perspective of the constitution of India. Salient features and characteristics of the constitution of India

UNIT –II (4hrs)

Scheme of fundamental rights, The scheme of the fundamental duties and its legal status. The Directive Principles of State Policy- its importance and implementation

UNIT –III (4hrs)

Federal structure and distribution of legislative and financial powers between the Union and the States. Parliamentary Form of Government in India-the constitution powers and status of the president of India. Amendment of the Constitutional Powers and Procedure

UNIT –IV (5hrs)

The historical perspectives of the constitutional amendments in India. Emergency provisions: National Emergency, President Rule, Financial Emergency Local self-government-Constitutional scheme in India

UNIT –V (3hrs)

Scheme of fundamental Right to Equality Scheme of fundamental Right to certain Freedom under Article 19 Scope of the Right to Life and Personal Liberty under Article 21.

COURSE OUTCOMES:

Students will be able to:

- Improve their knowledge about Indian constitution
- Value their identity and exercise their fundamental rights.
- Understand how differently government bodies function.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R20A0209) POWER SYSTEMS - III

COURSE OBJECTIVES:

- To understand and develop Y bus matrices
- To give the knowledge on per unit system.
- To understand and develop Z bus matrices
- To give the knowledge on faults analysis.
- Give the knowledge of iterative method in power systems.
- To understand the concepts load flow studies.

UNIT I:

PER UNIT REPRESENTATION OF POWER SYSTEMS: The one-line diagram, impedance and reactance diagrams, per unit quantities, changing the base of per unit quantities, advantages of per unit system.

POWER SYSTEM NETWORK MATRICES: Bus Incidence Matrix, Y-bus formation by Direct and Singular Transformation Methods, Numerical Problems.

UNIT II:

FORMATION OF Z-BUS: Partial network, Algorithm for the Modification of Z Bus Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and addition of element between two old buses

UNIT–III

SYMMETRICAL COMPONENTS AND FAULT CALCULATIONS: Significance of positive, negative and zero sequence components, sequence impedances and sequence networks, fault calculations, sequence network equations, single line to ground fault, line to line fault, double line to ground fault, three phase faults, faults with fault impedance.

UNIT–IV

LOAD FLOW STUDIES I: Derivation of Static load flow equations. Load Flow Solutions Using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

UNIT–V

LOAD FLOW STUDIES II: Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (One Iteration only) and finding Line Flows/Losses for the given Bus Voltages, Newton Raphson Method (Polar coordinates only): Load Flow Solution with and without P-V Buses, Derivation of Jacobian Elements, Fast Decoupled Method**.**

TEXT BOOKS:

1. C.L.Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Publishing Co., 2001.
2. D.P.Kothari and I.J.Nagrath, Modern Power System Analysis, 4th Edn, Tata McGraw Hill Education Private Limited2011.

REFERENCEBOOKS:

1. D. P. Kothari: Modern Power System Analysis-Tata McGraw Hill Pub. Co. 2003
2. Hadi Scadat: Power System Analysis – Tata McGraw Hill Pub. Co.2002
3. W.D. Stevenson: Elements of Power system Analysis – McGraw Hill International Student Edition.

COURSE OUTCOMES:

At the end of the course the student will be able to:

- Understand the concept of per unit system and faults in power systems.
- Evaluate the admittance matrix of a given power systems.
- Analyze the power system using iterative methods.
- Understand the concept of load flow studies in power system.
- Understand the PF and computer control in power system.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(R20A0566) ARTIFICAL INTELLIGENCE & MACHINE LEARNING

COURSE OBJECTIVES:

- To train the students to understand different types of AI agents.
- To understand various AI search algorithms.
- Fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation.
- To introduce the basic concepts and techniques of machine learning and the need for Machine learning techniques for real world problem
- To provide understanding of various Machine learning algorithms and the way to evaluate the performance of ML algorithms

UNIT - I:

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II:

Advanced Search: Constructing Search Trees, Stochastic Search, AO* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III:

Machine-Learning: Introduction. Machine Learning Systems, Forms of Learning: Supervised and Unsupervised Learning, reinforcement – theory of learning – feasibility of learning – Data Preparation– training versus testing and split.

UNIT - IV:

Supervised Learning:

Regression: Linear Regression, multi linear regression, Polynomial Regression, logistic regression, Non-linear Regression, Model evaluation methods. Classification: – support vector machines (SVM), Naïve Bayes classification

UNIT - V:

Unsupervised learning

Nearest neighbor models – K-means – clustering around medoids – silhouettes – hierarchical clustering – k-d trees, Clustering trees – learning ordered rule lists – learning unordered rule.

Reinforcement learning- Example: Getting Lost -State and Action Spaces

TEXT BOOKS:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice Hall, 2010.
2. MACHINE LEARNING An Algorithmic Perspective 2nd Edition, StephenMarsland,2015, by Taylor & Francis Group, LLC
3. Introduction to Machine Learning, The Wikipedia Guide

REFERENCES:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009. 2. George F. Luger,
2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.
3. Introduction to Machine Learning, Second Edition, Ethem Alpaydın, the MIT Press, Cambridge, Massachusetts, London, England.
4. Machine Learning, Tom M. Mitchell, McGraw-Hill Science, ISBN: 0070428077
5. Understanding Machine Learning:From Theory to Algorithms, c 2014 by ShaiShalev-Shwartz and Shai Ben-David, Published 2014 by Cambridge University Press.

COURSE OUTCOMES:

1. Understand the informed and uninformed problem types and apply search strategies to solve them.
2. Apply difficult real-life problems in a state space representation so as to solvethose using AI techniques like searching and game playing.
3. Apply machine learning techniques in the design of computer systems
4. To differentiate between various categories of ML algorithms
5. Design and make modifications to existing machine learning algorithms.

PROFESSIONAL ELECTIVE - III

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE - III)
(R20A0219) POWER SYSTEM OPERATION AND CONTROL

COURSE OBJECTIVES:

- To understand real power control and operation
- To know the importance of frequency control
- To analyze different methods to control reactive power
- To understand unit commitment problem and importance of economic load dispatch

UNIT – I:

ECONOMIC OPERATION OF POWER SYSTEMS: Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected. Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

UNIT – II:

UNIT COMMITMENT & POWER SYSTEM STABILITY: Unit Commitment: Statement of Unit Commitment problem – constraints; spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints. Solution methods - forward dynamic programming approach.

Power System Stability: Introduction, power angle equation, steady state stability, transient stability and swing equation. Equal area criterion of stability – applications of equal area criterion, step by step solution of swing equation – factors effecting transient stability.

UNIT –III

MODELLING OF TURBINE, GENERATOR AND AUTOMATIC CONTROLLERS:

Modelling of Turbine: First order Turbine model, Block Diagram representation of Steam Turbine. Modelling of Governor: Mathematical Modelling of Speed Governing System – Derivation of small signal transfer function. Modelling of generator load model, modelling of power systems

UNIT – IV

AUTOMATIC LOAD FREQUENCY CONTROL: Necessity of keeping frequency constant. Definitions of Control area – Single area control – Block diagram representation of an isolated power system – Steady state analysis – Dynamic response – Uncontrolled case. Load frequency control of 2-area system – uncontrolled case and controlled case, tie-line bias control. Proportional plus Integral control of single area and its block diagram representation, steady state response.

UNIT – V:

REACTIVE POWER AND VOLTAGE CONTROL: Overview of Reactive Power control – Reactive Power compensation in transmission systems - advantages and disadvantages of different types of compensating equipment for transmission systems; load compensation – Specifications of load compensator, Uncompensated and compensated transmission lines: shunt, Series and synchronous

Compensation, Receiving end power circle diagrams. Methods of voltage control – Tap changing transformer. Tap setting of OLTC transformer.

TEXT BOOKS:

1. C.L.Wadhwa, Electrical Power Systems, 3rd Edn, New Age International Publishing Co., 2001.
2. D.P.Kothari and I.J.Nagrath, Modern Power System Analysis, 4th Edn, Tata McGraw Hill Education Private Limited2011.

REFERENCEBOOKS:

1. P. Kothari: Modern Power System Analysis-Tata McGraw Hill Pub. Co. 2003
2. HadiScadat: Power System Analysis – Tata McGraw Hill Pub. Co.2002
3. W.D. Stevenson: Elements of Power system Analysis – McGraw Hill International Student Edition.

COURSE OUTCOMES:

After completion of this course, the student will be able to

- Analyze the optimal scheduling of power plants
- Analyze the steady state behavior of the power system for voltage and frequency fluctuations
- Describe reactive power control of a power system
- Design suitable controller to dampen the frequency and voltage steady state oscillations

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – II SEM **L/T/P/C**
3/-/-/3

(PROFESSINAL ELECTIVE-III)
(R20A0220) POWER SYSTEM DYNAMICS & STABILITY

COURSE OBJECTIVES:

- To remember the dynamic characteristics of power system equipment,
- To recognize dynamic performance of power systems
- To illustrate the system stability and controls.

UNIT –I:

INTRODUCTION: General basic concept of Power System Stability, States of operation & System Security, System Dynamics Problems, Review of Classical Model, System Model, Analysis of Steady State Stability & Transient Stability

UNIT –II:

MODELLING OF SYNCHRONOUS MACHINE: Synchronous Machine, Park's Transformation, Analysis of Steady State Performance, P. U. Quantities, Equivalent Circuit of Synchronous Machine

UNIT –III:

EXCITATION SYSTEMS & PRIME MOVER CONTROLLERS: Simplified Representation of Excitation Control, Excitation systems, Modeling, Block Diagram, State Equations, Prime Mover Control System, Transmission Line & Load Modeling

UNIT –IV:

DYNAMICS OF SYNCHRONOUS GENERATOR CONNECTED TO INFINITE BUS: System Model, Synchronous Machine Model, System Simulation, Consideration of other Machine Models including SVC Model

UNIT –V:

SMALL SIGNAL STABILITY: -Single and multi-machine system, Damping and Synchronizing torque Analysis, Power System Stabilizers Transient Stability and Voltage Stability controllers. Voltage Stability: Introduction, affecting factors, analysis, comparison with angle stability

TEXT BOOKS:

1. K. R. Padiyar, Power System Dynamics – Stability & Control, BS Publications
2. I.J. Nagrath and M. Gopal, Control system engineering, Wiley Eastern Ltd, 3rd edition, 2000.

REFERENCE BOOKS:

2. Benjamin C. Kuo, Automatic Control system, Prentice Hall of India Pvt Ltd. 2Prabha Kundur, Power System Stability and Control, Tata McGraw Hill
3. Power System Dynamics and Stability by Jan Machowski, Janusz Bialek, James Richard Bumby, Dr Jim Bumby

COURSE OUTCOMES:

Upon the completion of the subject, the student will be able to

- Choose the fundamental dynamic behavior and controls of power systems to perform basic stability analysis.
- Comprehend concepts in modeling and simulating the dynamic phenomena of power systems Interpret results of system stability studies
- Analyze theory and practice of modeling main power system components, such as synchronous machines, excitation systems and governors

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – II SEM **L/T/P/C**
3/-/-/3

(PROFESSINAL ELECTIVE-III)
(R20A0221) POWER SYSTEM RELIABILITY

COURSE OBJECTIVES:

To study and understand:

- Concepts of probability theory
- Systems Model ling and Evaluation of Reliability with different methods
- Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes
- Concepts of multi-Component & Approximate System Reliability Evaluation

UNIT-I

BASIC PROBABILITY THEORY: Basic concepts – Rules for combining Probabilities of events – Failure Density and Distribution functions – Bernoulli's trials – Binomial distribution – Expected value and standard deviation for binomial distribution – Examples.

UNIT-II

NETWORK MODELING AND RELIABILITY EVALUATION: Basic concepts – Evaluation of network Reliability / Unreliability – Series systems, Parallel systems, Series - Parallel systems, partially redundant systems – Types of redundancies - Evaluation of network Reliability / Unreliability using conditional probability method – Paths based and Cut set- based approach – complete event tree and reduced event tree methods -Examples.

UNIT-III

TIME DEPENDENT PROBABILITY: Basic concepts – Reliability functions f(t), F(t), R(t), h(t) – Relationship between these functions – Baths tubs curve – Exponential failure density and distribution functions - Expected value and standard deviation of Exponential distribution – Measures of reliability – MTTF, MTTR, MTBF – Evaluation of network reliability / Unreliability of simple Series, Parallel, Series-Parallel systems - Partially redundant systems - Evaluation of reliability measure – MTTF for series and parallel systems –Examples.

UNIT-IV

DISCRETE MARKOV CHAINS & CONTINUOUS MARKOV PROCESSES: Basic concepts – Stochastic transitional Probability matrix – time dependent probability evaluation – Limiting State Probability evaluation – Absorbing states – Markov Processes- Model ling concepts – State space diagrams – time dependent reliability evaluation of single component repairable model – Evaluation of Limiting State Probabilities of one, two component repairable models – Frequency and duration concepts – Frequency balance approach - Examples.

UNIT-V

MULTI COMPONENT & APPROXIMATE SYSTEM RELIABILITY EVALUATION: Recursive relation for evaluation of equivalent transitional rates, cumulative probability and cumulative frequency and 'n' component repairable model - Series systems, Parallel systems, Basic reliability indices – Cut set approach – Examples.

TEXT BOOK:

1. System Reliability Concepts by V. Sankar, Himalaya Publishing House, 2015.

REFERENCE BOOKS:

1. Reliability Evaluation of Engineering Systems by Roy Billinton and Ronald N. Allan, Reprinted in India B. S. Publications, 2007.
2. Reliability Engineering by E. Balagurusamy, Tata McGraw Hill, 2003.
3. Reliability and Maintainability Engineering by Charles E. Ebeling, Tata McGraw Hill, 2000.
4. Probability concepts in Electric Power system – G.J. Anders- 1st edition –1990 – John Wiley & sons.

COURSE OUTCOMES:

At the end of the course students will be able to:

- Apply the Concepts of probability theory for Systems Modelling and Evaluation of Reliability in different methods
- Apply the Concepts of Time dependent probability and Discrete Markov Chains & Continuous Markov Processes in establishing the reliability figure of practical systems
- Carry out multi-Component & Approximate System Reliability Evaluation

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE – II SEM **L/T/P/C**
3/-/-/3

(PROFESSINAL ELECTIVE-III)
(R20A0222) ELECTRICAL DISTRIBUTION SYSTEMS

Prerequisites: Power System – I, Power System - II

Course Objectives:

- To distinguish between transmission and distribution systems
- To understand design considerations of feeders
- To compute voltage, drop and power loss in feeders
- To understand protection of distribution systems
- To examine the power factor improvement and voltage control

UNIT - I

General Concepts: Introduction to distribution system, Distribution system planning, Factors effecting the Distribution system planning, Load modelling and characteristics. Coincidence factor - contribution factor - Loss factor - Relationship between the load factor and loss factor. Load growth, Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.
Distribution Feeders: Design Considerations of Distribution Feeders: Radial, loop and network types of primary feeders, Introduction to low voltage distribution systems (LVDS) and High voltage distribution systems (HVDS), voltage levels, Factors effecting the feeder voltage level, feeder loading, Application of general circuit constants (A,B,C,D) to radial feeders, basic design practice of the secondary distribution system, secondary banking, secondary network types, secondary mains.

UNIT - II

Substations: Location of Substations: Rating of distribution substation, service area with 'n' primary feeders. Benefits derived through optimal location of substations. Optimal location of Substations (Perpendicular bisector rule and X, Y co-ordinate method).
System Analysis: Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines, analysis of non-three phase systems, method to analyze the distribution feeder cost.

UNIT - III

Protection: Objectives of distribution system protection, types of common faults and procedure for fault calculations, over current Protective Devices: Principle of operation of Fuses, Auto-Circuit Recloser - and Auto-line sectionalizes, and circuit breakers.

Coordination: Coordination of Protective Devices: Objectives of protection co-ordination, general coordination procedure, Types of protection coordination: Fuse to Fuse, Auto-Recloser to Fuse, Circuit breaker to Fuse, Circuit breaker to Auto-Recloser.

UNIT - IV

Compensation for Power Factor Improvement: Capacitive compensation for power-factor control - Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and switched), effect of series capacitors, difference between shunt and series capacitors, Calculation of Power factor correction, capacitor allocation - Economic justification of capacitors - Procedure to determine the best capacitor location.

UNIT - V

Voltage Control: Voltage Control: Importance of voltage control, methods of voltage control, Equipment for voltage control, effect of shunt capacitors, effect of series capacitors, effect of AVB/AVR on voltage control, line drop compensation, voltage fluctuations.

TEXT BOOKS:

1. Turan Gonen, Electric Power Distribution System Engineering, CRC Press, 3rd Edition 2014.
2. V. Kamaraju, Electrical Power Distribution Systems, Tata Mc Graw Hill Publishing Company, 2nd edition, 2010.

REFERENCE BOOKS:

1. G. Ram Murthy, Electrical Power Distribution hand book, 2nd edition, University press 2004.
2. A.S. Pabla, Electric Power Distribution, Tata McGraw Hill Publishing company, 6th edition, 2013.

COURSE OUTCOMES:

After completion of this course, the student able to

- Distinguish between transmission, and distribution line and design the feeders
- Compute power loss and voltage drop of the feeders
- Design protection of distribution systems
- Understand the importance of voltage control and power factor improvement

PROFESSIONAL ELECTIVE - IV

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**

3/-/-/3

(PROFESSIONAL ELECTIVE-IV)
(R20A0223) SOLID STATE DRIVES

Prerequisite: Electrical Machines I, Electrical Machines II, Power Electronics

COURSE OBJECTIVES:

- To learn the various methods of speed control of DC Motors using single and three phase thyristor converters.
- To understand the concept of four quadrant operation of DC Motors with single and dual fully controlled converters.
- To study the methods of speed control of DC Motors by DC choppers.
- To learn the various methods of speed control of Induction Motors from both Stator and Rotor side.
- To study and understand the various Synchronous motor speed control methods with CSI, VSI, Cycloconverter etc. in both open loop and closed loop operation.

UNIT – I

CONTROL OF DC MOTORS BY SINGLE PHASE CONVERTERS: Introduction to thyristor-controlled Drives, Single Phase half and fully controlled converters connected to D.C separately excited and D.C series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics – Numerical Problems.

CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS: Three phase half and fully controlled converters connected to D.C separately excited and D.C series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Numerical Problems.

UNIT-II

FOUR QUADRANT OPERATION OF DC DRIVES: Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT – III

CONTROL OF DC MOTORS BY CHOPPERS: Single quadrant, two –quadrant and four quadrant chopper fed dc separately excited and series excited motors – Continuous current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed D.C Motors – Closed Loop operation (Block Diagram Only)

UNIT-IV

CONTROL OF INDUCTION MOTOR:

Variable voltage characteristics: - Control of Induction Motor by AC Voltage Controllers – Waveforms speed torque characteristics.

Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and Cycloconverter- PWM control – Comparison of VSI and CSI operations

– Speed torque characteristics – Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT –V

CONTROL OF SYNCHRONOUS MOTORS:

Separate control & self - control of synchronous motors – Operation of self-controlled synchronous motors by VSI and CSI – Operation – Waveforms – speed torque characteristics – Applications – Advantages – Closed Loop control operation of synchronous motor drives (Block Diagram Only).

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Electronic Circuits, Devices and applications by M.H. Rashid, PHI.

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company,1998
2. Modern Power Electronics and AC Drives by B.K. Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications.
4. A First course on Electrical Drives – S K Pillai New Age International (P) Ltd. 2ndEditon.

COURSE OUTCOMES:

At the end of the course the student would be able to:

1. Select an appropriate electric drive system based on their applications.
2. Explain the operation of single and multi-quadrant electric drives of different types with both Single and Dual fully controlled converters.
3. Analyze the performance of single phase & three phase rectifier fed as well as chopper fed DC motors.
4. Study and decide upon an appropriate speed control method for Induction Motors from amongst several methods studied, based on the application.
5. Explain clearly the speed control of Synchronous motors in both open and closed loop operation with CSI, VSI and cycloconverter based drives.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-IV)
(R20A0224) OPTIMIZATION TECHNIQUES

COURSE OBJECTIVES:

This course introduces various optimization techniques:

- To understand classical, linear programming, transportation problem, simplex algorithm, dynamic programming,
- Constrained and unconstrained optimization techniques for solving and optimizing an electrical and electronic engineering circuits design problems in real world situations.

UNIT- I

INTRODUCTION & CLASSICAL OPTIMIZATION TECHNIQUES: Statement of an Optimization problem — design vector — design constraints — constraint surface — objective function — objective function surfaces — classification of Optimization problems Single variable Optimization — multi variable Optimization without constraints — necessary and sufficient conditions for minimum/maximum multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers — multivariable Optimization with inequality constraints — Kuhn — Tucker conditions.

UNIT — II

LINEAR PROGRAMMING: Standard form of a linear programming problem — geometry of linear programming problems — definitions and theorems — solution of a system of linear simultaneous equations — pivotal reduction of a general system of equations — motivation to the simplex method — simplex algorithm.

UNIT – III

TRANSPORTATION PROBLEM & UNCONSTRAINED OPTIMIZATION: Finding initial basic feasible solution by north — west corner rule, least cost method and Vogel's approximation method testing for optimality of balanced transportation problems, one dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method. Univariate method, Powell's method and steepest descent method.

UNIT-IV

CONSTRAINED NONLINEAR PROGRAMMING: Characteristics of a constrained problem, Classification, Basic approach of Penalty FtIn method; Basic approaches of lnteñor and Exterior penalty function methods, Introduction to convex Programming Problem.

UNIT—V

DYNAMIC PROGRAMMING: Dynamic programming multistage decision processes — types — concept of sub optimization and the principle of optimality — computational procedure in dynamic programming — examples illustrating the calculus method of solution – examples illustrating the tabular method of solution.

TEXT BOOKS

1. Engineering optimization. Theory and practice. "S. S. Rao, New Age International (P) Limited.
2. Optimization Methods in Operations Research and systems Analysis, K.V. Mittal and C. Mohan, New Age International (P) Limited.

REFERENCE BOOKS

2. Operations Research, Dr. S.D. Shama. Introductory Operations Research, H.S. Kasene & K.D. Kumar, Springer (India), Pvt. LTc.
3. Operations Research: An Introduction, H.A. Taha, Pearson Pvt. Ltd.
4. Operations Research, Rk, hard Bronson, Govindasami Naadimuthu, Tata Mc Graw — Hill Company Limited.

COURSE OUTCOMES:

After going through this course, the student gets a thorough knowledge on:

- Optimization of electrical and electronics engineering problems through classical optimization techniques, linear programming, simplex algorithm, transportation problem, unconstrained optimization.
- Constrained non-linear programming and dynamic programming, with which he/she can able to apply the above conceptual things to real world electrical and electronics problems and applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-IV)
(R20A0225) DIGITAL CONTROL SYSTEMS

Prerequisite: Control Systems

Course Objectives:

- To understand the fundamentals of digital control systems, z-transforms
- To understand state space representation of the control systems, concepts of controllability and observability
- To study the estimation of stability in different domains
- To understand the design of discrete time control systems, compensators, state feedback controllers, state observers through various transformations

UNIT- I

Discrete Representation of Continuous Systems: Basics of Digital Control Systems. Discrete representation of continuous systems. Sample and hold circuit. Mathematical Modeling of sample and hold circuit. Effects of Sampling and Quantization. Choice of sampling frequency. ZOH equivalent.

UNIT- II

Discrete System Analysis: Z-Transform and Inverse Z Transform for analyzing discrete time systems. Pulse Transfer function. Pulse transfer function of closed loop systems. Mapping from s-plane to z plane. Solution of Discrete time systems. Time response of discrete time system.

Stability of Discrete Time System: Stability analysis by Jury test. Stability analysis using bilinear transformation. Design of digital control system with dead beat response. Practical issues with dead beat response design.

UNIT- III

State Space Approach for Discrete Time Systems: State space models of discrete systems, State space analysis. Lyapunov Stability. Controllability, reach-ability, Reconstructibility and observability analysis. Effect of pole zero cancellation on the controllability & observability.

UNIT- IV

Design of Digital Control System: Design of Discrete PID Controller, Design of discrete state feedback controller. Design of set point tracker. Design of Discrete Observer for LTI System. Design of Discrete compensator.

UNIT- V

Discrete Output Feedback Control: Design of discrete output feedback control. Fast output sampling (FOS) and periodic output feedback controller design for discrete time systems.

TEXT BOOKS:

1. K. Ogata, “Digital Control Engineering”, Prentice Hall, Englewood Cliffs, 1995.
2. M. Gopal, “Digital Control Engineering”, Wiley Eastern, 1988.

REFERENCE BOOKS:

1. G. F. Franklin, J. D. Powell and M. L. Workman, “Digital Control of Dynamic Systems”, Addison- Wesley, 1998.
2. B.C. Kuo, “Digital Control System”, Holt, Rinehart and Winston, 1980.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

- Obtain discrete representation of LTI systems.
- Analyze stability of open loop and closed loop discrete-time systems.
- Design and analyze digital controllers.
- Design state feedback and output feedback controllers.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-IV)
(R20A0226) AUTOMATION WITH PLC SYSTEMS

COURSE OBJECTIVES:

For programmable logic controllers & embedded systems, the course will enable the students

1) To provide and ensure a comprehensive understanding of using advanced controllers in measurement and control instrumentation.
2) To analyze Programmable Logic Controller (PLC), IO Modules and internal features, Programming in Ladder Logic.
3) Understand the core of an embedded system
4) To learn the design process of embedded system applications.
5) To understands the RTOS and inter-process communication.
6) To understand different communication interfaces.

UNIT-I:

INTRODUCTION TO EMBEDDED SYSTEMS: Complex systems and microprocessors-embedding computers, characteristics of embedded computing applications, challenges in embedded computing system design, performance in embedded computing; The embedded system design process- requirements, specification, architecture design, designing hardware and software, components, system integration.

UNIT-II:

TYPICAL EMBEDDED SYSTEM: Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTS; Memory-ROM, RAM, memory selection for embedded systems; Sensors andactuators, Onboard communication interfaces-I2C, SPI.

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop-based approach, operating system-based approach; embedded firmware development languages-assemblylanguage-based development, high level language-based development.

UNIT-III:

RTOS BASED EMBEDDED SYSTEM DESIGN: Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling, how to choose an RTOS.

UNIT-IV:

PLC BASICS: PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules. PLC Programming: Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

UNIT-V:

LADDER DIAGRAMS FOR PROCESS CONTROL: Ladder diagrams and sequence listings, ladderdiagram construction and flowchart for spray process system.

PLC REGISTERS: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

TEXT BOOKS:

1. Programmable Logic Controllers- Principles and Applications by John W. Webb and Ronald A.Reiss, Fifth Edition, PHI.
2. Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
3. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1. Programmable Logic Controllers- Programming Method and Applications by JR. Hackworth and F.D Hackworth Jr., Pearson, 2004.
2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.

COURSE OUTCOMES:

After going through this course, the student will be able to

- Describe the main functional units in a PLC and be able to explain how they interact
- Develop ladder logic programming for simple process.
- Understand and design the embedded systems
- Understand Embedded Firmware design approaches
- Learn the basics of RTOS

OPEN ELECTIVE – III

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-II Sem **L/T/P/C**

3/-/-/3

OPEN ELECTIVE - II
(R20A0453) ROBOTICS AND AUTOMATION

COURSE OBJECTIVES:

1) To study overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) To study in detail about Robotics and sensors.
3) To study about AVR RISC Microcontroller architecture in detail.
4) To study about ARM Processor in detail.
5) To study about Artificial Intelligence in Robotics.

UNIT -I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

The AVR RISC microcontroller architecture: Introduction, AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory, EEPROM, I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM Processor: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

[1] Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning

[2] Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education, India2003.

[3] ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

[1] M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.

[2] Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech

[3] Microcontrollers and applications, Ajay V Deshmukh, TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to

1) Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) Understand in detail about Robotics and sensors.
3) Understand AVR RISC Microcontroller architecture in detail.
4) Understand about ARM Processor in detail.
5) Understand about Artificial Intelligence in Robotics.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-II Sem **L/T/P/C**

3/-/-/3

OPEN ELECTIVE - III
(R20A1254) BIG DATA ARCHITECTURE

COURSE OBJECTIVES

To learn

1. To introduce the terminology, technology and its applications
2. To introduce the concept of Analytics and Visualization
3. To demonstrate the Big Data Architecture and its components, tools

UNIT I

Big Data Introduction: Classification of Digital Data, Structured and Unstructured Data, Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data, Why Big Data - Traditional Business Intelligence versus Big Data, Importance of Big Data.

UNIT II:

Big Data Architecture Introduction: Big Data Architecture- Definition, Why Big Data Architecture. Evolution of Big Data Architecture. Market Trends. Big Data Architecture and Its Sources. Big Data Architecture Use Cases.

UNIT-III

Big Data architecture components: Data ingestion, Data storage, Data Computing, Data Analysis, Data Visualization. Understanding the Lambda architecture, HBase, Spark Libraries, Spark Streaming.

UNIT IV

Introducing Apache Spark: Introduction to Spark, Spark Architecture and its components, Features of Spark, Spark vs Hadoop, Challenges of Spark.

UNIT V

Introduction To Technology Landscape

NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

TEXT BOOKS:

1) Tom White — Hadoop: The Definitive Guide‖ Third Edit on, O'Reilly Media, 2012.
2) Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCE BOOKS:

3) Michael Berthold, David J. Hand, "Intelligent Data Analysis‖, Springer, 2007.
4) Jay Liebowitz, -Big Data and Business Analytics**||** Auerbach Publications, CRC press (2013)
5) Tom Plunkett, Mark Hornick, -Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop‖, McGraw-Hill/Osborne Media (2013), Oracle press.
6) Glen J. Myat, -Making Sense of Data**||**, John Wiley & Sons, 2007
7) Pete Warden, -Big Data Glossary**||**, O 'Reily, 2011.
8) Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9) ArvindSathi, —Big Data Analytics: Disruptive Technologies for Changing the Game‖, MC Press, 2012
10) Paul Zikopoulos, Dirk DeRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corigan, "Harness the Power of Big Data the IBM Big Data Platform ", Tata McGraw Hill Publications

COURSE OUTCOMES:

Upon successful completion of the course, the student is able to

1) Identify Big Data and its Business Implications.
2) Categorize and summarize Big Data and its importance.
3) Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce in big data analytics
4) Compare various file systems and use an appropriate file system for storing different types of data.
5) Connect to web data sources for data gathering, integrate data sources with Hadoop components to process streaming data.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-II Sem **L/T/P/C**

3/-/-/3

OPEN ELECTIVE - III

(R20A6251) INFORMATION SECURITY

COURSE OBJECTIVES:

1. To learn the objectives of information security, importance and application of confidentiality, integrity, authentication and availability
2. To understand various cryptographic algorithms and basic categories of threats to computers and networks
3. To describe public-key cryptosystem, enhancements made to IPv4 by IPSec
4. To understand Intrusions and intrusion detection
5. To gain knowledge on fundamental ideas of public-key cryptography.
6. To generate and distribute a PGP key pair and use the PGP package to send an encrypted e- mail message.
7. To understand the importance and implementation of Web security and Firewalls

UNIT - I:

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT - II:

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES), Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman), Key Distribution.

UNIT - III:

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, Digital signatures, **Authentication Applications:** Kerberos, X.509
Authentication Service, Public — Key Infrastructure, Biometric Authentication

UNIT - IV:

E-Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

UNIT - V:

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure **Inter-branch** Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

TEXT BOOKS:

1. Cryptography and Network Security : William Stallings, Pearson Education,4[11]i Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2" Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, lst Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2"d Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

COURSE OUTCOMES:

1. Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
2. Ability to identify information system requirements for both of them such as client and server.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.
4. Ability to understand the current legal issues towards information security.
5. Understand the importance of Web security and Firewalls

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-II Sem **L/T/P/C**

3/-/-/3

OPEN ELECTIVE - III
(R20A0554) CLOUD COMPUTING FUNDAMENTALS

COURSE OBJECTIVES:

1. To learn various system models for Distributed and Cloud Computing.
2. To understand about Virtual machines, Its Structure and mechanisms.
3. To learn Cloud Computing Paradigm.
4. To introduce the various levels of services that can be achieved by cloud.
5. To describe the security aspects in cloud.

UNIT- I

Systems Modeling: Distributed System Models and Enabling Technologies- Scalable Computing over the Internet- System Models for Distributed and Cloud Computing- Software Environments for Distributed Systems and Clouds- Performance, Security, and Energy Efficiency

UNIT- II

VIRTUALIZATION: Virtual machines and Virtualization of Clusters and data centers-, Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms- Virtualization of CPU, Memory, and I/O Devices- Virtual Clusters and data centers

UNIT- III

FOUNDATIONS: Introduction to Cloud Computing- Migrating into a Cloud-The Enterprise Cloud Computing Paradigm.

UNIT- IV

INFRASTRUCTURE AS A SERVICE (IAAS) & PLATFORM (PAAS): Virtual machines provisioning and Migration services-On the Management of Virtual machines for Cloud Infrastructures- Aneka— Integration of Private and Public Clouds

UNIT- V

SOFTWARE AS A SERVICE (SAAS) &DATA SECURITY IN THE CLOUD: Google App Engine , An Introduction to the idea of Data Security- The Current State of Data Security in the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

TEXT BOOKS:

1. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
2. Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S.TanuraiSelvi, TMH, 2012.
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

COURSE OUTCOMES:

1. Understanding various system models for Distributed and Cloud Computing.
2. Understanding about Virtual machines, Its Structure and mechanisms.
3. Learning Cloud Computing Paradigm.
4. Understanding the various levels of services that can be achieved by cloud.
5. Learning about security aspects in cloud.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE- II Sem **L/T/P/C**

3/-/-/3

(OPEN ELECTIVE III)
(R20A0352) DESIGN THINKING

COURSE OBJECTIVES:

1. To understand the engineering design process and identification of customer need.
2. To understand innovative problem-solving concepts.
3. To understand the principles of Design for Manufacturing and FMEA.
4. To know about the design for assembly principles.
5. To know about the concepts of design for environment and design for recycling.

UNIT-I

Introduction: Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.

Identification of Customer Need: Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing: Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly: Assembly Principles, Process, Worksheet, Assumptions. Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment: Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. GenrichAltshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

REFERENCE BOOKS

1. The Art of Innovation, by Tom Kelley.
2. Design Thinking, by Nigel Cross.
3. The Design of Business: by Roger Martin.

COURSE OUTCOMES:

1. The importance of design in innovation.
2. Design tools and processes can generate innovative new ideas.
3. Design and design thinking to innovative in areas such as engineering, software development and business operations.
4. Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
5. To describe the various case studies for design for environment.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. EEE-II Sem **L/T/P/C**

3/-/-/3

OPEN ELECTIVE - III
(R20A0029) BUSINESS ANALYTICS

COURSE OBJECTIVES

1. To help students in understanding how the managers use business analytics for managerial decision making.

UNIT-I: UNDERSTANDING BUSINESS ANALYTICS

Introduction-Meaning of Analytics - Evolution of Analytics - Need of Analytics - Business Analysis vs. Business Analytics - Categorization of Analytical Models - Data Scientist vs. Data Engineer vs. Business Analyst - Business Analytics in Practice - Types of Data - Role of Business Analyst.

UNIT-II: DEALING WITH DATA AND DATA SCIENCE

Data: Data Collection - Data Management - Big Data Management - Organization/Sources of Data - Importance of Data Quality - Dealing with Missing or Incomplete Data - Data Visualization - Data Classification.

Data Science Project Life Cycle: Business Requirement - Data Acquisition - Data Preparation - Hypothesis and Modeling - Evaluation and Interpretation - Deployment - Operations - Optimization - Applications for Data Science

UNIT-III: DATA MINING AND MACHINE LEARNING

Data Mining: The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis - Basic Concept of Association Analysis and Cluster Analysis.

Machine Learning: History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning - Reinforcement Learning - Frameworks for Building Machine Learning Systems.

UNIT-IV: APPLICATIONS OF BUSINESS ANALYTICS

Overview of Business Analytics Applications: Financial Analytics - Marketing Analytics - HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social Media Analytics - Healthcare Analytics - Energy Analytics - Transportation Analytics - Lending Analytics - Sports Analytics - Future of Business Analytics.

UNIT-V: ETHICAL, LEGAL AND ORGANIZATIONAL ISSUES

Issues & Challenges: Business Analytics Implementation Challenges - Privacy andAnonymizaiton - Hacking and Insider Threats - Making Customer Comfortable.

REFERENCES:

1. James R Evans, Business Analytics, Global Edition, Pearson Education
2. U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi
3. Ger Koole, An Introduction to Business Analytics, Lulu.com, 2019
4. J.D. Camm, J.J. Cochran, M. J. Fry, J.W. Ohlmann, D.R. Anderson, D.J. Sweeney, T. A. Williams - *Essentials of Business Analytics*, 2e; Cengage Learning.
5. Vipin Kumar, Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Pearson Education India
6. Bhimasankaram Pochiraju, Sridhar Seshadri, Essentials of Business Analytics: An Introduction to the Methodology and its Application, Springer

COURSE OUTCOMES:

Upon successful completion of the course, the student is able to

- The students will be familiar with the practices of analyzing and reporting the business data useful for the insights of business growth and development.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**

-/-/3/1.5

(R20A0287) POWER ELECTRONICS & SIMULATION LAB

COURSE OBJECTIVES:

The student will understand:

- The characteristics of power electronic devices.
- The operation of single-phase voltage controller, converters and Inverters circuits with Rand RL loads. Analyze the TPS7A4901, TPS7A8300 and TPS54160 buck regulators.

Among the following experiments any 10 are to be conducted:

1. Study the Characteristics of SCR, MOSFET & IGBT
2. Single Phase half-controlled converter with R load and RL loads
3. Single Phase fully controlled bridge converter with R and RL loads
4. Single Phase AC Voltage Controller with R and RL Loads
5. Single Phase Cyclo - converters with R and RL loads
6. Single Phase series inverter with R and RL loads
7. DC Chopper with R and RL Loads
8. Speed control of PMDC motor using MOSFET
9. Three Phase half-controlled bridge converter with R-load
10. Single Phase dual converter with RL loads
11. Single-phase full converter using RLE loads using PSPICE
12. Single-phase AC voltage controller using RLE loads using PSPICE.
13. Resonant pulse commutation circuit using PSPICE.
14. Buck chopper using PSPICE.
15. Single phase Inverter with PWM control using PSPICE.

COURSE OUTCOMES:

After completion of this course, the student is able to

- Understand the operating principles of various power electronic converters.
- Use power electronic simulation packages& hardware to develop the power converters.
- Analyze and choose the appropriate converters for various applications.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**

-/-/3/1.5

(R20A0580) ARTIFICIAL INTELLIGENCE & MACHINE LEARNING LAB

LAB OBJECTIVES:

1. Familiarity with the Prolog programming environment.
2. To introduce students to the basic concepts and techniques of Machine Learning.
3. To implement classification and clustering methods.
4. To become familiar with various supervised and unsupervised learning Algorithms.
5. Learning basic concepts of Prolog through illustrative examples and small exercises &Understanding list data structure in Prolog.

STUDY OF PROLOG; WRITE THE FOLLOWING PROGRAMS USING PROLOG/PYTHON

week-1. Write a program to implement all set operations(Union, Intersection, Complement etc)

week-2. Implementation of DFS for water jug problem

week-3. Implementation of BFS for tic-tac-toe problem

week-4. Solve 8-puzzle problem using best first search

week-5. Write a program to solve 8 queens problem

week-6. Implementation of Hill-climbing to solve 8- Puzzle Problem

MACHINE LEARNING

WEEK-1

Data Extraction, Wrangling

1. Loading different types of dataset in Python
2. Arranging the data

WEEK-2

Data Visualization

1. Handling missing values
2. Plotting the graphs

WEEK-3

Supervised Learning

Implementation of Linear Regression

WEEK-4

Implementation of K-nearest Neighbor

WEEK-5

Unsupervised Learning

Implementing K-means Clustering

WEEK-6

Unsupervised Learning

Implementing Hierarchical Clustering

LAB OUTCOMES:

1. Apply various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction,)
2. Understand the fundamentals of knowledge representation, inference using AI tools..
3. Solve the problems using various machine learning techniques
4. Design application using machine learning techniques

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III YEAR B. Tech EEE– II SEM **L/T/P/C**
2/-/-/-

(MANDATORY COURSE)
(R20A0006) TECHNICAL WRITING

INTRODUCTION:

Technical Communication and Soft skills focus on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mock interviews.

The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

COURSE OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.

UNIT –I

PERSONAL EVALUATION: Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT -II

PROFESSIONAL COMMUNICATION: Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT – III

CAREER PLANNING: Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT – IV

TECHNICAL WRITING: Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT – V

ETHICS AND RESPONSIBILITIES: Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCE BOOKS:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London,2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, NewDelhi 2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH NewDelhi 2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0414) MICROPROCESSORS & MICROCONTROLLERS

COURSE OBJECTIVES:

1. To understand the basics of microprocessors and microcontrollers architectures and its functionalities.
2. To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
3. To design and develop Microprocessor/ microcontroller-based systems for real time applications using low level language like ALP.
4. To understand the concepts of ARM processor.

UNIT –I

8086 ARCHITECTURES: Architecture of 8086, Register Organization, Memory addresses, Memory Segmentation, Physical Memory Organization, Signal descriptions of 8086- Common Function Signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT –II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086:

Addressing modes, Instruction Set, Assembler Directives, Procedures, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT –III

I/O INTERFACE: 8255 PPI, Various Modes of Operation and Interfacing to 8086, D/A and A/D Converter, Stepper motor, Interfacing of DMA controller 8257.Memory Interfacing to 8086, Interrupt Structure of 8086, Interrupt Vector Table.

COMMUNICATION INTERFACE: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT –IV

INTRODUCTION TO MICROCONTROLLERS: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs.

UNIT –V

8051 REAL TIME CONTROL: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters.

ARM PROCESSOR: Fundamentals, Registers, Current program status register, Pipeline, Interrupt and the vector table.

TEXT BOOKS

1. D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition2006.
2. Kenneth. J. Ayala, The 8051 Microcontroller, 3rd Ed., Cengage Learning.
3. ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc.,2007

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition2006.
2. The 8051Microcontrollers, Architecture and Programming and Applications -K. Uma Rao, Andhe Pallavi, Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design – Liu and GAGibson, PHI, 2ndEd.
4. Microcontrollers and Application – Ajay. V. Deshmukh, TMGH,2005.

COURSE OUTCOMES:

After going through this course, the student will

1. Learn the internal organization of popular 8086/8051 microprocessors/microcontrollers.
2. Learn hardware and software interaction and integration.
3. Learn the design of microprocessors/microcontrollers-based systems

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE – I SEM **L/T/P/C**
3/-/-/3

(R20A0227) ELECTRIC VECHICLES

COURSE OBJECTIVES:

- To understand the models, describe hybrid vehicles and their performance.
- To understand the different possible ways of energy storage.
- To understand the different strategies related to hybrid vehicle operation & energy management.

UNIT 1:

INTRODUCTION: Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, and mathematical models to describe vehicle performance.

UNIT 2:

INTRODUCTION TO HYBRID ELECTRIC VEHICLES: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

UNIT 3:

ELECTRIC TRAINS: Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis. Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

UNIT 4:

ENERGY STORAGE: Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power electronics, selecting the energy storage technology, Communications, supporting subsystems

UNIT 5:

ENERGY MANAGEMENT STRATEGIES: Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies and implementation issues of energy management strategies.

TEXT BOOKS:

1. C. Mi, M. A. Masrur and D. W. Gao, “Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives”, John Wiley & Sons, 2011.
2. S. Onori, L. Serrao and G. Rizzoni, “Hybrid Electric Vehicles: Energy Management Strategies”,Springer, 2015.

REFERENCE BOOKS:

1. M. Ehsani, Y. Gao, S. E. Gay and A. Emadi, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design”, CRC Press, 2004.
2. T. Denton, “Electric and Hybrid Vehicles”, Routledge, 2016

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

- Study the models to describe hybrid vehicles and their performance.
- Implement the different possible ways of energy storage.
- Adopt the different strategies related to hybrid vehicle operation & energy management.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(R20A0519) BIG DATA ANALYTICS

COURSE OBJECTIVES

Students will try to learn:

- To provide an overview of an exciting growing field of big data analytics.
- To introduce the tools required to manage and analyze big data like Hadoop, No Sql Map Reduce.
- To demonstrate the Big Data Architecture and its components, tools.
- To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To enable students to have skills that will help them to solve complex real-world problems in for decision support.

UNIT I

INTRODUCTION TO BIG DATA AND ANALYTICS: Classification of Digital Data, Structured and Unstructured Data - Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Why Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments - Basically Available Soft State Eventual Consistency - Top Analytics Tools

UNIT II

INTRODUCTION TO TECHNOLOGY LANDSCAPE: NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

UNIT III

INTRODUCTION TO MONGODB AND CASSANDRA: Mongo DB: Why Mongo DB - Terms used in RDBMS and Mongo DB - Data Types – Mongo DB Query Language Cassandra: Features - CQL Data Types – CQLSH – Key spaces - CRUD Operations – Collections - Using a Counter - Time to Live - Alter Commands - Import and Export - Querying System Tables

UNIT IV

INTRODUCTION TO MAPREDUCE PROGRAMMING AND HIVE: Map Reduce - Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression Hive: Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub-Query–Joins–Aggregations–GroupbyandHaving–RCFileImplementation-HiveUserDefined Function - Serialization and Deserialization - Hive Analytic Functions.

UNIT V

INTRODUCTION TO PIG & JASPERREPORTS: Pig: Introduction - Anatomy – Features – Philosophy - Use Case for Pig - Pig Latin Overview - Pig Primitive Data Types - Running Pig - Execution Modes of Pig – HDFS Commands - Relational Operators – Eval Function - Complex Data Types - Piggy Bank - User-Defined Functions – Parameter Substitution - Diagnostic Operator - Word Count Example using Pig - Pig at Yahoo! – Pig Versus Hive – Jasper Report using Jasper soft.

TEXT BOOK:

1. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley Publications, First Edition,2015

REFERENCE BOOKS:

1. Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman, "Big data for dummies", John Wiley & Sons, Inc. (2013)
2. Tom White, "Hadoop the Definitive Guide", O'Reilly Publications, Fourth Edition,2015
3. Dirk Deroos, Paul C. Zikopoulos, Roman B. Melnky, Bruce Brown, Rafael Coss, "Hadoop for Dummies", Wiley Publications,2014
4. Robert D. Schneider, "Hadoop for Dummies", John Wiley & Sons, Inc. (2012)
5. Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill, 2012 Chuck Lam, "Hadoop in Action", Dreamtech Publications,2010

COURSE OUTCOMES:

Students will be able to:

1. Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
3. Categorize and summarize Big Data and its importance.
4. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
5. Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc

PROFESSIONAL ELECTIVE - V

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-V)
(R20A0228) EHVAC TRANSMISSION

COURSE OBJECTIVES:

- Illustrate basic concepts of extra high voltage AC transmission and understand the need for it.
- Outline the line and ground reactive parameters and voltage gradients of conductors.
- Describe effects of corona and methods of associated measurement.
- Associate the knowledge of electro static field theory and traveling wave theory.
- Select voltage control methods for extra high voltage AC transmission system.

UNIT - I

INTRODUCTION: Necessity of EHV AC transmission – advantages and problems–power handling capacity and line losses mechanical considerations – resistance of conductors – properties of bundled conductors – bundle spacing and bundle radius- Examples. Line and ground reactive parameters: Line inductance and capacitances – sequence inductances and capacitances – modes of propagation – ground return – Examples.

UNIT – II

VOLTAGE GRADIENTS OF CONDUCTORS: Electrostatics – field of sphere gap – field of line changes and properties – charge – potential relations for multi-conductors – surface voltage gradient on conductors – distribution of voltage gradient on subconductors of bundle – Examples.

UNIT - III CORONA EFFECTS: Power loss and audible noise (AN) – corona loss formulae – charge voltage diagram – generation, characteristics – limits and measurements of AN – relation between 1-phase and 3-phase AN levels – Examples. Radio interference (RI) – corona pulses generation, properties, limits – frequency spectrum – modes of propagation – excitation function – measurement of RI, RIV and excitation functions – Examples.

UNIT - IV

ELECTRO STATIC FIELD: Calculation of electrostatic field of EHV/AC lines – effect on humans, animals and plants – electrostatic induction in unenergized circuit of double-circuit line – electromagnetic interference-Examples. Traveling wave theory: Traveling wave expression and solution- source of excitation- terminal conditions- open circuited and short-circuited end- reflection and refraction coefficients-Lumped parameters of distributed lines-generalized constants-No load voltage conditions and charging current

UNIT - V

VOLTAGE CONTROL: Power circle diagram and its use – voltage control using synchronous condensers – cascade connection of shunt and series compensation – sub synchronous resonance in series capacitor – compensated lines – static VAR compensating system

TEXT BOOKS:

1. R. D. Begamudre, “EHVAC Transmission Engineering”, New Age International (p) Ltd. 3rd Edition.
2. K.R. Padiyar, “HVDC Power Transmission Systems” New Age International (p) Ltd. 2nd revised Edition, 2012.

REFERENCES:

1. S. Rao “EHVAC and HVDC Transmission Engineering. Practice” Khanna publishers.
2. Arrillaga. J “High Voltage Direct Current Transmission” 2nd Edition (London) Peter Peregrines, IEE, 1998.
3. Padiyar. K.R, “FACTS Controllers in Power Transmission and Distribution” New Age International Publishers, 2007.
4. Hingorani H G and Gyugyi. L “Understanding FACTS-Concepts and Technology of Flexible AC Transmission Systems” New York, IEEE Press, 2000.

COURSE OUTCOMES(COs):

- Student can learn about the trends in EHV AC transmission
- Student can calculate the line inductance and capacitance of bundle conductors.
- Student understands the effect of Corona and radio interference.
- Explore the concept of Electro static field and the travelling wave theory
- Student can analyze compensated devices for voltage control.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-V)
(R20A0425) EMBEDDED SYSTEM DESIGN

COURSE OBJECTIVES:

- Understand the basics of an embedded system.
- Program an embedded system.
- To learn the design process of embedded system applications.
- To understands the RTOS and inter-process communication.
- To understand different communication interfaces.

UNIT-I

INTRODUCTION TO EMBEDDED SYSTEMS: Complex systems and microprocessors-embedding computers, characteristics of embedded computing applications, challenges in embedded computing system design, performance in embedded computing; The embedded system design process-requirements, specification, architecture design, designing hardware and software, components, system integration, design example.

UNIT-II

TYPICAL EMBEDDED SYSTEM: Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTs; Memory-ROM, RAM, memory according to the type of interface, memory shadowing, memory selection for embedded systems; Sensors, actuators and other components- sensors, actuators, seven segment LED, relay, piezo buzzer, push button switch, reset circuit, brownout protection circuit, oscillator circuit real time clock, watch dog timer.

UNIT-III

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT: Embedded firmware design approaches-super loop-based approach, operating system-based approach; Embedded firmware development languages-assembly language-based development, high level language-based development; Programming in embedded c.

UNIT-IV RTOS BASED EMBEDDED SYSTEM DESIGN: Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling; task communication-shared memory, message passing.

UNIT-V COMMUNICATION INTERFACE: Onboard communication interfaces-I2C, SPI, UART, 1 wire interface, parallel interface; External communication interfaces-RS232 and RS485, USB, infrared, Bluetooth, wi-Fi, zigbee, GPRS; Automotive networks and sensor networks.

TEXT BOOKS:

1) Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
2) Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1) Embedded System Design -frank vahid, tony grivargis, johnWiley.
2) Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.
3) Embedded Systems – Raj kamal, TMH
4) An embedded Software Primer, David e Simon, Pearson education

COURSE OUTCOMES:

1) Understand and design the embedded systems
2) Learn the basics of OS and RTOS
3) Understand types of memory and interfacing to external world
4) Understand embedded firmware design approaches
5) Understand different communication interfaces.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-V)
(R20A0229) AI TECHNIQUES IN ELECTRICAL ENGINEERING

Pre-requisites: Power Systems Operation and Control

Course Objectives:

- To locate soft commanding methodologies, such as artificial neural networks, Fuzzy logic and genetic Algorithms.
- To observe the concepts of feed forward neural networks and about feedback neural networks.
- To practice the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy control
- To analyze genetic algorithm, genetic operations and genetic mutations.

UNIT - I

Artificial Neural Networks: Introduction, Models of Neuron Network-Architectures – Knowledge representation, Artificial Intelligence and Neural networks–Learning process - Error correction learning, Hebbian learning –Competitive learning-Boltzman learning, supervised learning-Unsupervised learning–Reinforcement learning-Learning tasks.

UNIT - II

ANN Paradigms: Multi-layer perceptron using Back propagation Algorithm (BPA), Self – Organizing Map (SOM), Radial Basis Function Network-Functional Link Network (FLN), Hopfield Network.

UNIT - III

Fuzzy Logic: Introduction –Fuzzy versus crisp, Fuzzy sets-Membership function –Basic Fuzzy set operations, Properties of Fuzzy sets –Fuzzy Cartesian Product, Operations on Fuzzy relations –Fuzzy logic–Fuzzy Quantifiers, Fuzzy Inference-Fuzzy Rule based system, Defuzzification methods.

UNIT - IV

Genetic Algorithms: Introduction-Encoding –Fitness Function-Reproduction operators, Genetic Modeling –Genetic operators-Cross over-Single site cross over, Two point cross over –Multi point cross over Uniform cross over, Matrix cross over-Cross over Rate-Inversion & Deletion, Mutation operator – Mutation –Mutation Rate-Bit-wise operators, Generational cycle-convergence of Genetic Algorithm.

UNIT - V

Applications of AI Techniques: Load forecasting, Load flow studies, Economic load dispatch, Load frequency control, Single area system and two area system, Reactive power control, Speed control of DC and AC Motors.

TEXT BOOKS

1. S. Rajasekaran and G.A.V. Pai Neural Networks, Fuzzy Logic & Genetic Algorithms, PHI, New Delhi, 2003.
2. Rober J. Schalkoff, Artificial Neural Networks, Tata McGraw Hill Edition, 2011.

REFERENCE BOOKS:

1. P.D. Wasserman; Neural Computing Theory & Practice, Van Nostrand Reinhold, New York, 1989.
2. Bart Kosko; Neural Network & Fuzzy System, Prentice Hall, 1992
3. D.E. Goldberg, Genetic Algorithms, Addison-Wesley 1999.

Course Outcomes:

Upon the completion of this course, the student will be able to

- Understand feed forward neural networks, feedback neural networks and learning techniques.
- Understand fuzziness involved in various systems and fuzzy set theory.
- Develop fuzzy logic control for applications in electrical engineering
- Develop genetic algorithm for applications in electrical engineering.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-V)
(R20A0230) SMART GRID TECHNOLOGIES

Course Objectives:

- To group various aspects of the smart grid,
- To defend smart grid design to meet the needs of a utility
- To select issues and challenges that remain to be solved
- To analyze basics of electricity, electricity generation, economics of supply and demand, and the various aspects of electricity market operations in both regulated and deregulated environment.

UNIT- I

Introduction to Smart Grid: What is Smart Grid? Working definitions of Smart Grid and Associated Concepts –Smart grid Functions-Traditional Power Grid and Smart Grid –New Technologies for Smart Grid – Advantages –Indian Smart Grid –Key Challenges for Smart Grid.

UNIT- II

Smart Grid Architecture: Components and Architecture of Smart Grid Design –Review of the proposed architectures for Smart Grid. The fundamental components of Smart Grid designs – Transmission Automation – Distribution Automation –Renewable Integration

UNIT- III

Tools and Techniques for Smart Grid: Computational Techniques –Static and Dynamic Optimization Techniques –Computational Intelligence Techniques –Evolutionary Algorithms –Artificial Intelligence techniques.

UNIT - IV

Distribution Generation Technologies: Introduction to Renewable Energy Technologies – Micro grids–Storage Technologies –Electric Vehicles and plug –in hybrids –Environmental impact and Climate Change –Economic Issues.

Communication Technologies and Smart Grid: Introduction to Communication Technology – Synchro-Phasor Measurement Units (PMUs) –Wide Area Measurement Systems (WAMS).

UNIT - V

Control of Smart Power Grid System: Load Frequency Control (LFC) in Micro Grid System – Voltage Control in Micro Grid System – Reactive Power Control in Smart Grid. Case Studies and Test beds for the Smart Grids.

TEXT BOOKS:

1. Stuart Borlase, Smart Grids, Infrastructure, Technology and Solutions, CRC Press, 2013
2. Gil Masters, Renewable and Efficient Electric Power System, Wiley-IEEE Press, 2004.

REFERENCE BOOKS:

1. A.G. Phadke and J.S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer Edition, 2010.
2. T. Ackermann, Wind Power in Power Systems, Hoboken, NJ, USA, John Wiley, 2005.

Course Outcomes:

At the end of the course the student will be able to:

- Understand the features of small grid in the context of Indian grid.
- Understand the role of automation in transmission and distribution.
- Apply evolutionary algorithms for smart grid.
- Understand operation and maintenance of PMUs, PDCs, WAMs, and voltage and frequencycontrol in micro grid

PROFESSIONAL ELECTIVE - VI

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-VI)
(R20A0231) SOLAR & WIND ELECTRICAL SYSTEMS

COURSE OBJECTIVES:

- To understand the basic concepts of Solar energy, Solar radiation & Wind turbines
- To understand the fundamentals of solar cells, PV systems and their classification.
- To understand the generation schemes with variable speed Wind turbines.
- To study and understand the technologies related to subsystems like Frequency converters, Inverters, Charge controllers etc that form part of Solar and Wind power plants.
- To study the concepts of integration of Solar and Wind power plants with Grid

UNIT-I

SOLAR ENERGY BASIC CONCEPTS: Introduction to solar energy, Characteristics of solar radiation, Spectral distribution, Power density, Solar constant. Geometry of the Earth and Sun, Atmospheric effects on solar radiation - Estimation of solar energy availability - Solar radiation measurement and instrumentation, solar radiation data, Effect of collector tilt. Principle of direct solar energy conversion into electricity in a solar cell -Technologies-Amorphous, mono-crystalline, polycrystalline.

UNIT-II

SOLAR CELL FUNDAMENTALS, PV SYSTEMS, BOS AND CLASSIFICATION: Solar cell properties. I-V characteristics, output power - maximum power point – Principles of maximum power point trackers. Cell efficiency - Fill factor - Effect of irradiation and temperature. Block diagram of a basic solar power plant, Balance of systems - PV arrays and modules, inverters, batteries, charge controllers and Power conditioners. Classification - Central Power Station System - Distributed PV System - Stand-alone PV system - Grid Interactive PV System - Small system for consumer applications - Hybrid solar PV system

UNIT-III

FUNDAMENTALS OF WIND TURBINES: Power contained in wind - Thermodynamics of wind energy – Efficiency limit for wind energy conversion. Design of the wind turbine rotor: Diameter of the rotor – Choice of the number of blades – Choice of the pitch angle – The tower – The transmission system and gear box – Power speed characteristics – Torque speed characteristics. Wind turbine control systems: Pitch angle control – Stall control – Power electronic control – Yaw control – Control strategy.

UNIT-IV

WIND GENERATOR SCHEMES WITH VARIABLE SPEED TURBINES: Review of modern wind turbine technologies, Fixed and Variable speed wind turbine, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent Magnet Synchronous Generators, Power electronics converters. Generator configurations, Converter control.

UNIT-V

GRID INTEGRATION ISSUES: Overview of grid code technical requirements. Fault ride-through for wind farms - real and reactive power regulation, voltage and frequency operating limits, solar PV and wind farm behavior during grid disturbances, Power quality issues. Power system interconnection experiences, Hybrid and isolated operations of solar PV and wind systems.

TEXT BOOKS:

1. Wind Electrical Systems, S.N. Bhardra, D. Kastha and S. Banerjee, Oxford University Press.
2. T. Ackermann, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
3. Solar Cells from Basics to Advanced Systems, Chenming Hu and Richard M. White, Tata McGraw Hill Education Private Limited. .
4. Solar Cells – Operating Principles, Technology and System Applications, Martin A. Green, Prentice Hall Inc.

REFERENCE BOOKS:

1. Renewable Energy Sources, Twidell &Weir, fourth Edition (2009), Tata McGraw Hill Education Private Limited, New Delhi.
2. Grid integration of wind energy conversion systems. H. Siegfried and R. Waddington. John Wiley and Sons Ltd., 2006.
3. Non-Conventional Energy Sources, G.D. Rai, fourth edition (2009), Khanna Publishers, New Delhi
4. Fundamentals of Renewable Energy Systems, D. Mukherjee, S. Chakrabarti, New Age International.
5. Renewable Energy Sources and Emerging Technologies, D. P. Kothari, K. C. Singal, RakeshRanjan, PHI Learning Private Limited.

COURSE OUTCOMES:

After going through this course, the student gets a working knowledge on:

- The basic concepts of solar energy, solar radiation and fundamentals of wind turbines.
- Different types of PV Solar cells, PV systems and their integration.
- Generation schemes with variable speed turbines and other types of Generators.
- Various other subsystems of Solar and Wind based power plants.
- Issues related to Grid-integration of Solar & Wind energy systems and their solutions

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-VI)
(R20A0232) HVDC TRANSMISSION

Prerequisite: Power System-I, Power System-II, Power System Protection, Power System Operation and Control, Power Electronics

Course Objectives:

- To compare EHV AC and HVDC systems
- To analyze Graetz circuit and also explain 6 and 12 pulse converters
- To control HVDC systems with various methods and to perform power flow analysis in AC/DC systems
- To describe various protection methods for HVDC systems and Harmonics

UNIT- I

Basic Concepts Necessity of HVDC systems, Economics and Terminal equipment of HVDC transmission systems, Types of HVDC Links, Apparatus required for HVDC Systems, Comparison of AC and DC Transmission, Application of DC Transmission System, Planning and Modern trends in D.C. Transmission.

Analysis of HVDC Converters: Choice of Converter Configuration, Analysis of Graetz circuit, Characteristics of 6 Pulse and 12 Pulse converters, Cases of two 3 phase converters in Y/Y mode – their performance.

UNIT- II

Converter and HVDC System Control: Principle of DC Link Control, Converters Control Characteristics, Firing angle control, Current and extinction angle control, Effect of source inductance on the system, Starting and stopping of DC link, Power Control.

Reactive Power Control in HVDC: Introduction, Reactive Power Requirements in steady state, sources of reactive power- Static VAR Compensators, Reactive power control during transients.

UNIT- III

Power Flow Analysis in AC/DC Systems: Modelling of DC Links, DC Network, DC Converter, Controller Equations, Solution of DC load flow, P.U. System for DC quantities, solution of AC-DC Power flow-Simultaneous Method-Sequential method.

UNIT- IV

Converter Faults and Protection: Converter faults, protection against over current and over voltage in converter station, surge arresters, smoothing reactors, DC breakers, Audible noise, space charge field, corona effects on DC lines, Radio interference.

UNIT-V:

Harmonics: Generation of Harmonics, Characteristics harmonics, calculation of AC Harmonics, Non- Characteristics harmonics, adverse effects of harmonics, Calculation of voltage and Current harmonics, Effect of Pulse number on harmonics

Filters: Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. "K. R. Padiyar", HVDC Power Transmission Systems: Technology and system Interactions, New Age International (P) Limited, and Publishers, 1990.
2. "S K Kamakshaiah, V Kamaraju", HVDC Transmission, TMH Publishers, 2011

REFERENCE BOOKS:

1. "S. Rao", EHVAC and HVDC Transmission Engineering and Practice, Khanna publications, 3rd Edition 1999.
2. "Jos Arrillaga", HVDC Transmission, The institution of electrical engineers, IEE power & energy series 29, 2nd edition 1998.
3. "E. W. Kimbark", Direct Current Transmission, John Wiley and Sons, volume 1, 1971.
4. "E. Uhlmann", Power Transmission by Direct Current, B. S. Publications, 2009

Course Outcomes:

After completion of this course the student is able to

- Compare EHV AC and HVDC system and to describe various types of DC links
- Analyze Graetz circuit for rectifier and inverter mode of operation
- Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
- Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-VI)
(R20A0233) POWER QUALITY & FACTS DEVICES

COURSE OBJECTIVES:

To study

- The various power quality issues in Distribution systems.
- The objectives of Shunt and Series Reactive Power compensation.
- The importance of controllable parameters and types of FACTS controllers & their benefits.
- STATCOM & SVC and their comparison. Regulation of STATCOM, Functioning and control ofGCSC, TSSC and TCSC.

UNIT-I

POWER QUALITY PROBLEMS IN DISTRIBUTION SYSTEMS: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions. Wave-form Distortions: Harmonics,noise, notching, dc-offsets, fluctuations. Flicker and its measurement.

UNIT-II

TRANSMISSION LINES AND SERIES/SHUNT REACTIVE POWER COMPENSATION: Basics of AC Transmission. Analysis of uncompensated AC transmission lines. Passive Reactive Power Compensation. Shunt and series compensation at the mid-point of an AC line. Comparison of Seriesand Shunt Compensation.

UNIT-III

STATIC SHUNT COMPENSATORS: Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR Compensator-its characteristics, TCR, TSC, FC-TCR configurations, STATCOM -basic operating principle, control approaches and characteristics.

UNIT-IV

STATIC SERIES COMPENSATORS: Objectives of series compensator, variable impedance type of series compensators, TCSC, TSSC- Operating principles and control schemes, SSSC, Power Angle characteristics, Control range and VAR rating, Capability to provide reactive power compensation, external control.

UNIT-V

COMBINED COMPENSATORS: Introduction to Unified Power Flow Controller, Basic operating principles, Conventional control Capabilities, Independent control of real and reactive power.

TEXT BOOKS:

1. Electrical Power Systems Quality, Dugan Roger C. Santoso Surya, Mc Granaghan, Marks F. Beatyand H. Wayre, Mc Graw Hill.
2. Power Systems Quality Assessment, J. Arillaga, N.R. Watson, S. Clon, John Wiley.
3. “Understanding FACTS –Concepts and Technology of Flexible AC Transmission Systems”Narain G. Hingorani, Laszlo Gyugyi.

REFERENCE BOOKS:

1. Power Quality, C. Sankaran, CRC Press 4. Understanding power quality problems, Math H. Bollen,IEEE press.
2. A.T. John, "Flexible AC Transmission System", Institution of Electrical and Electronic Engineers (IEEE), 1999.

COURSE OUTCOMES:

After completion of this course, the student will be able to:

- Know the severity of power quality problems in distribution system and understand the concept of voltage sag transformation from up-stream (higher voltages) to downstream (lower voltage).
- Understand the Concept of improving the power quality to sensitive load by various mitigating custom power devices.
- Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping.
- Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
3/-/-/3

(PROFESSIONAL ELECTIVE-VI)
(R20A0234) ADVANCED CONTROL OF ELECTRIC DRIVES

Prerequisites: Power Electronics, Power Semiconductor Drives

Course Objectives:

- To know the power electronic converters
- To analyze the various control strategies of power converters for drives control
- To understand the advanced control techniques for DC and AC motor drives
- To go through the control strategies for drives using digital signal processors.

UNIT - I

Power Converters for AC Drives: PWM control of inverter, selected harmonic elimination, space vector modulation, current control of VSI, three level inverter, Different topologies, SVM for 3 level inverter, Diode rectifier with boost chopper, PWM converter as line side rectifier, current fed inverters with self-commutated devices. Control of CSI, H Bridge as a 4-Q drive.

UNIT - II

Induction Motor Drives: Different transformations and reference frame theory, modeling of induction machines, voltage fed inverter control-v/f control, vector control, direct torque and flux control (DTC).

UNIT - III

Synchronous Motor Drives: Modeling of synchronous machines, open loop v/f control, vector control, direct torque control, CSI fed synchronous motor drives.

UNIT - IV

Permanent Magnet Motor Drives: Introduction to various PM motors, BLDC and PMSM drive configuration, comparison, block diagrams, Speed and torque control in BLDC and PMSM.

Switched Reluctance Motor Drives: Evolution of switched reluctance motors; various topologies for SRM drives, comparison, closed loop speed and torque control of SRM.

UNIT - V

DSP Based Motion Control: Use of DSPs in motion control, various DSPs available, and realization of some basic blocks in DSP for implementation of DSP based motion control.

TEXT BOOKS:

1. B. K. Bose, “Modern Power Electronics and AC Drives”, Pearson Education, Asia, 2003.
2. P. C. Krause, O. Wasynczuk and S. D. Sudhoff, “Analysis of Electric Machinery and Drive Systems”, John Wiley & Sons, 2013.

REFERENCE BOOKS:

1. H. A. Taliyat and S. G. Campbell, “DSP based Electromechanical Motion Control”, CRC press, 2003.
2. R. Krishnan, “Permanent Magnet Synchronous and Brushless DC motor Drives”, CRC Press, 2009.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the operation of power electronic converters and their control strategies.
- Understand the vector control strategies for ac motor drives
- Understand the implementation of the control strategies using digital signal processors.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**
-/-/3/1.5

(R20A0288) POWER SYSTEMS LAB

COURSE OBJECTIVES:

- To perform testing of CT, PT's and Insulator strings.
- To find the characteristics of relays.
- To perform analysis on Transmission line models and Generators.

Among the following experiments any 10 are to be conducted:

1. Characteristics of IDMT over Current Relay.
2. Differential protection of 1-Φ transformer.
3. Characteristics of Micro Processor based Over Voltage.
4. Testing of CT, PT's and Insulator string.
5. ABCD constants and Regulation of a 3-Φ transmission line model.
6. Power circle diagrams of a 3-Φ transmission line model.
7. LG, LL and 3-Φ fault analysis of 3-Φ synchronous machine.
8. Formation of YBUS using MATLAB.
9. Formation of ZBUS using MATLAB.
10. Load Flow Analysis using Gauss Seidal (GS) Method using MATLAB.
11. Load Flow Analysis using Newton's Raphson (NR) Method using MATLAB.
12. Load Flow Analysis using Fast Decoupled (FD) Method using MATLAB.
13. Transient Stability Analysis for Single Machine connected to Infinite Bus by Point-by-Point method using MATLAB.

COURSE OUTCOMES:

After completion of this lab, the student will be able to

- Perform various load flow techniques
- Understand Different protection methods
- Analyze the experimental data and draw the conclusions.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE– I SEM **L/T/P/C**

-/-/3/1.5

(R20A0487) MICROPROCESSORS & MICROCONTROLLERS LAB

Note: - Minimum of 10 experiments has to be conducted

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16-bit arithmetic operations using 8086 (using Various Addressing Modes).
2. Program for sorting an array using 8086.
3. Program for searching a number or character in a string using 8086.
4. Program for string manipulations using 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/ Counter in 8051.
12. Program and verify Interrupt handling in 8051
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/ Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV YEAR B. Tech EEE – II SEM **L/T/P/C**
3/1/-/4

(R20A0337) INNOVATION, STARTUPS AND ENTERPRENEURSHIP

COURSE OBJECTIVES:

1. To understand the concept of innovation, new product development
2. To know the startup opportunities and startup equation
3. To understand new venture creation opportunities, its resources, and Requirements
4. To understand the Entrepreneurial Mindset and new trends in entrepreneurship
5. To understand the strategic perspectives in entrepreneurship

UNIT-I

Innovation Management: Concept of Innovation- Levels of Innovation- Incremental Vs Radical Innovation-Inbound and Outbound Ideation- Open and Other Innovative Ideation Methods-Theories of outsourcing New Product Development: Transaction Cost, Resource Based, Resource Dependence, Knowledge Based Theories.

UNIT-II

Startup opportunities: The New Industrial Revolution – The Big Idea- Generate Ideas with Brainstorming Business Startup - Ideation- Venture Choices - The Rise of the startup economy -The Six Forces of Change- The Startup Equation

UNIT-III

Startup Capital Requirements and Legal Environment: Identifying Startup capital Resource Requirements - estimating Startup cash requirements - Develop financial assumptions-Constructing a Process Map - Positioning the venture in the value chain - Launch strategy to reduce risks- Startup financing metrics – **Business plan**-The Legal Environment- Approval for New Ventures- Taxes or duties payable for new ventures.

UNIT-IV

Understanding Entrepreneurial Mindset- The revolution impact of entrepreneurship- The evolution of entrepreneurship - Functions of Entrepreneurs – types of entrepreneurs -Approaches to entrepreneurship- Process approach- Role of entrepreneurship in economic development-Twenty first century trends in entrepreneurship.

UNIT-V

Strategic perspectives in entrepreneurship - Strategic planning - Strategic actions strategic positioning- Business stabilization - Building the adaptive firms - Understanding the growth stage – Internal growth strategies and external growth strategies, Unique managerial concern of growing ventures. Initiatives by the Government of India to promote entrepreneurship, Social and women entrepreneurship.

TEXT BOOKS:

1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, Cengage Learning, 2016 Anjan Raichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International, 2010.
2. Innovation Management, C.S.G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010.

REFERENCE BOOKS

1. S. R. Bhowmik & M. Bhowmik, Entrepreneurship, New Age International, 2007.
2. Stuart Read, Effectual Entrepreneurship, Routledge, 2013
3. Rajeev Roy, Entrepreneurship, 2e, Oxford publications, 2012.
4. Nandan .H, Fundamentals of Entrepreneurship, PHI, 2013

COURSE OUTCOMES:

- Students will be able to understand the concept of innovation and new product development; startup opportunities and startup equation;
- new venture creation opportunities, its resources, and Requirements;
- the Entrepreneurial Mindset and new trends in entrepreneurship;
- strategic perspectives in entrepreneurship